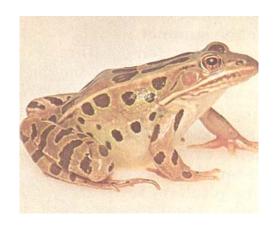
FINAL REPORT - FROG REPRODUCTION AND DEVELOPMENT STUDY

2000 RANA PIPIENS REPRODUCTION AND DEVELOPMENT STUDY



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PREFACE

The following report has been prepared for the "Supplemental Investigation Work Plan for the Lower Housatonic River" under the Technical Support Services, General Electric (GE) Housatonic Project, Pittsfield, Massachusetts, and is intended only for this specific project. The methods used are available in public scientific literature, and are thus, non-proprietary. Potential risk associated with the use or misuse of the methods or results from this study, outside the scope of this project, will be assumed by future investigators. The author would like to acknowledge Mr. Robert Rogers for his assistance in preparing this report.

INTRODUCTION

The United States Environmental Protection Agency (USEPA) is currently characterizing the natural resources of the Housatonic River in portions of Pittsfield, Lenox, and Lee, Massachusetts. The study area is approximately 19 K long and extends from Newell Street in Pittsfield to Woods Pond Dam in Lee. It includes riverine habitats, floodplain wetlands, and uplands associated with the main-stem of the river. Polychlorinated biphenyls (PCBs) that originated from the General Electric (GE) facility in Pittsfield have been found within the river and its adjacent floodplains (Woodlot Alternatives, 2001). Other contaminants of potential concern (COPCs) including dioxins/furans, polynuclear aromatic hydrocarbons (PAHs), Appendix IX organochlorine pesticides, and heavy metals have also been found at various locations within the Housatonic River study area.

Frogs were selected as the representative amphibian species due to their presence in the Housatonic River study area, reported sensitivity to PCBs and the other COPCs identified in the preceding paragraph, high potential for exposure due to both aquatic and terrestrial life stages, and capacity to be evaluated for reproductive and developmental metrics in the field and laboratory. In this report, we describe a study designed to evaluate reproductive performance and potential developmental effects in frogs potentially exposed to PCBs and other identified COPCs. COPCs, including dioxins and furans, are considered to be PCB-like in the sense that they induce similar toxicological effects as PCBs. Because frogs are considered sentinel species in the environment, selection of frogs for this study was further warranted.

The overall objective of this study was to assess the impact of potential PCB and other COPC exposure on local frog populations in the Lower Housatonic River area between the confluence of the East and West branches and Woods Pond Dam (target area). More specifically, the objectives of this study focused on the potential effect of PCB and other COPC contamination on reproduction, early development, and maturation (metamorphosis) in Northern Leopard frogs (*Rana pipiens*). These events represented critical stages in the life cycle of an amphibian and have provided important information concerning the capacity of PCB and other COPCs to

disrupt the life cycle of this anuran species. The *R. pipiens* reproduction and development study was conducted concurrently with a separate developmental study in *R. sylvatica*. The *R. sylvatica* developmental study was conducted to provide assurance that adequate developmental data in amphibians was collected in the event insufficient developmental data was available from the *R. pipiens* reproduction and development study. Results of the *R. sylvatica* developmental study are provided in a separate report (Fort Environmental Laboratories, 2003).

In the present study, effects of PCB and other COPCs exposure to sexually mature adult frogs on reproductive capacity and developmental fitness in their progeny were evaluated using adult specimens collected from both target and reference sites. The routes of exposure and transgenerational transport of the PCBs and other COPCs were also assessed to determine the extent of maternal transfer to the oocytes and developing progeny, as well as, the extent of bioaccumulation during various stages of development. Reproductive performance and early developmental effects were assessed by comparing gravidity, numbers of eggs produced, necrosis, oocyte maturity (stage), sperm count, sperm morphology and viability, fertilization, early embryogenesis, mortality, and morphological development (teratogenesis) in frogs obtained from the target area, with the same endpoints evaluated in frogs originating from an external reference source. To document potential impact on longer-term developmental processes, exposure studies were conducted in the laboratory throughout metamorphosis. Metamorphosis, because of the array of morphological and biochemical processes occurring simultaneously, is a sensitive stage in the life cycle of amphibians and a stage that is sensitive to endocrine disruption. Since several classes of organic contaminants have been shown to alter thyroid function in metamorphosing frogs (Fort et al., 1999a and 1999b), this portion of the study was of great importance.

MATERIALS AND METHODS

PROJECT PARTICIPANTS

The laboratories that participated in this study were Woodlot Alternatives (Topsham, ME), Weston Solutions (Pittsfield, MA), The Stover Group (Stillwater, OK), the Texas A&M University Geotechnical and Environmental Research Group (GERG) (College Station, TX), Fort Environmental Laboratories (Stillwater, OK), and EVS Environment Consultants (North Vancouver, BC, Canada).

Woodlot Alternatives was responsible for the initial ecological characterization (Woodlot Alternatives, 2001), designation of sampling sites, and collection of biological specimens from the field. Weston Solutions collected water and sediment samples, provided a clearinghouse for submission of samples for analytical chemistry analysis to the contract laboratories, and maintained analytical and biological databases. GERG was responsible for conducting COPC analyses with water, sediment, and tissue samples. Culturing and monitoring of developing embryos, larvae, and metamorphs were performed by The Stover Group. Fort Environmental Laboratories completed data collection and review, including an external assessment of malformation and necropsy, data processing, data analysis, and reporting. EVS Environment Consultants assisted with statistical analysis and review of the draft report.

MATERIALS

Equipment used during the field collection phase included the following items: ambient air thermometers, collection nets, drift fence, and funnel traps, digital GPS locators, sphagnum moss (cured and sanitized); data forms; medium seines; fiberboard boxes; field maps; field notebooks and clipboards; field marking pencils; flashlights; bubble wrap; distilled water; live crickets; plastic sheeting; heavy work gloves; steel-toed boots; polyethylene Ziploc-type bags for shipping; portable cassette tape recorders and tapes; cellular 900 MHz telephones; preprinted sample labels; reusable ice packs; liquid nitrogen; dry ice; duct tape; sample containers for

residual egg masses; sample bags for sacrificed female frogs; permanent magic markers; Site Health and Safety Plan (HASP); 6 gallon Styrofoam coolers; Vermiculite; and 3% (w/v) 3-aminobenzoac acid ethyl ester (MS-222) [anesthetic].

APPROACH

Overview

In summary, male and female frogs were collected between March 25 and April 22, 2000, from the target areas and transported to The Stover Group. Because no R. pipiens were found, and thus, collected from the originally designated reference sites within the Washington Mountain Lake region due primarily to adverse weather conditions and seasonal factors, R. pipiens reference specimens were obtained from Carolina Biological Supply (Burlington, NC), and transported to The Stover Group. In the original study design, the gravidity of the female specimens was determined and recorded; and the gravid females were hormonally superovulated to induce production of egg masses, which were then artificially fertilized using sperm collected from males from the same sampling sites. The number of eggs produced per female, frequency of necrosis, and stage distribution were determined. Sperm counts, sperm cell morphology, and overall sperm cell viability were also assessed. However, the poor reproductive condition of the native female specimens collected from the sampling locations within the primary study area resulted in unsuccessful artificial fertilization in the target specimens. Successful artificial fertilization was completed with external reference specimens. The inability to artificially produce viable offspring from the target site specimens necessitated alteration of the study design in order to collect developmental data in R. pipiens. In the modified design, field-collected egg masses or young larvae and artificially fertilized external reference egg masses were raised in the laboratory through metamorphosis in respective site water and sediment. Thus, the egg mass and larval specimens cultured from the contaminated sites were not biologically related to the adult specimens collected from the various target sites. Limited egg mass or larval specimens from contaminated sites were found during the resampling effort.

Artificially fertilized egg masses from external reference specimens were monitored in the laboratory for fertilization, morphology, and coloration. Mortality and morphological abnormalities were measured in the developing larvae from the external reference egg masses and field collected egg masses and young larvae. Deformities, particularly those that could directly affect juvenile survival, were specifically documented by type of terata induced and number responding. Exposure studies were conducted throughout metamorphosis. An evaluation of metamorphosis, which included limb development, morphology of tail resorption, and development of secondary morphological characteristics, was also conducted. In an effort to establish the role of transgeneral COPC transfer relative to environmental COPC exposure in inducing the toxicological effects observed in this study, a cross over exposure study in which reference hatchling were exposed to contaminated water and sediment from the study area. Further, to confirm that PCBs were capable of inducing toxicological effects in R. pipiens, reference hatchlings were exposed to reference water and sediment spiked with 30 mg/Kg Aroclor 1260. Water and sediment samples, adult whole bodies, ovaries of females from which egg masses were evaluated, and whole bodies of developing larvae were collected for tissue residue analysis to allow determination of a relationship between observed effects and the COPCs [PCBs, dioxins/furans, PAHs, and Appendix IX pesticides and metals]. The utility of measuring multiple parameters (endpoints) decreased the likelihood of overlooking a potential effect from COPC exposure, particularly PCBs.

Endpoints and Data Quality Assurance

Gravidity

Reproductive capacity in female frogs was evaluated initially by determining if mature eggs were present within the specimens collected, and the degree of ovary distension. Although gravidity was a binary response, gravidity was determined immediately upon specimen arrival at the laboratory and was recorded with accompanying chain-of-custody information (sample identification) and health characteristics upon arrival (general appearance and weight). Gravidity was also used to confirm the sex of the specimens.

Eggs Produced (Egg Mass)

Total egg counts were determined and recorded for each specimen. Manual counting of the egg masses was required. Egg masses were counted at least twice, unless the values exceed 10% of one another. In the case of excessive variability, the process of counting was repeated. In addition, a separate analyst using the same criteria described above verified the counts.

Necrosis and Oocyte Stage Profile

The number of necrotic eggs was determined using the same approach and quality assurance measures as described for egg mass determination. The oocyte stage of development profile was one of the best indicators of reproductive status in frogs. The laborious nature of this process required significant attention to consistency to be accurate and required independent peer verification. Data verification using the approach described above for egg mass counting was used to verify the results.

Sperm Count, Viability, and Morphology

The assessment of male reproductive fitness on a gametogenesis level depended on the accurate collection and recording of the data. Total sperm cells and abnormal sperm was counted at least three times unless the values exceeded 10% of one another. In the case of excessive variability, the process of counting was repeated. In addition, a separate analyst verified the counts, using the same criteria described above.

Fertilization

Formation of a cleavage plane in the egg was the unambiguous sign of fertilization and was used to determine the number of eggs fertilized. The same quality control measures described for the previous metrics was used to ensure the quality of the data collected and reported.

Early Embryogenesis, Hatching Success, Mortality, and Morphological Development

To determine the effect of PCB and other COPC exposure on frog development, early embryonic development, hatching, and more advanced morphological development was monitored. Embryolethal effects were also recorded throughout development. A separate analyst using the criteria described above verified counts.

Metamorphosis

The effect of PCB and other COPC exposure on maturation of larval *R. pipiens* was monitored, since this life phase is often a sensitive indicator of potential stress. Detailed records of developmental stage, types and incidences of mal-development, and the normalcy of limb development and tail resorption were collected. Digital photographic documentation of metamorphic events represented an important record of maturation. Peer review by a separate analyst was used to verify the data collected and authenticate the results.

Water and Sediment COPC Analyses

Analysis of water and sediment for the various COPC identified were performed. Quality control specifications for these data are identified in the project-wide QAPP (Weston, 1999).

Tissue Residue Analysis

Analysis of selected tissue samples including, whole adult females, ovaries, and larvae, for the various COPCs identified in this study were performed. QC considerations to ensure achievement of the DQOs for this parameter followed the QAPP (Weston, 1999).

Selection of Test Species

The species selected for this study was *R. pipiens*. *R. pipiens* were present in the Housatonic River study area and constituted an important component of the Housatonic River ecosystem. *R.*

pipiens have a limited home range, spending a good proportion of their life spans in aquatic environments; thus, their COPC body burdens reflected the diet, sediment, and water column concentration in the areas from which they were collected. Also, because *R. pipiens* lay thousands of eggs, it was possible to collect a sufficient number of eggs to ensure completion of the study. Finally, there is an established peer-reviewed methodology for *in vitro* fertilization of *R. pipiens* and culturing of their embryos in the laboratory (Dickerson, 1969; Nussbaum et al., 1983; Carolina Biological Supply Company, 1993; Fort et al., 1996a; Ankley et al., 1998; ASTM, 1998; Bantle et al., 1998).

Sampling Design

Temporal applicability of the study was directed toward the peak breeding season for *R. pipiens* (Stebbins, 1995). The spatial applicability of the study was limited to the reach of the Housatonic River between the confluence and the Woods Pond Dam. This reach represented a range of PCB concentrations in sediment such that development of exposure-response relationships was feasible. Additionally, *R. pipiens* habitat was present in Woods Pond, and other backwater regions.

Adult *R. pipiens* were collected from the target areas over sets of three-day periods between March 25 and April 22, 2000. The search for specimens focused on areas known to be favored by *R. pipiens*, such as shallow areas on the edges of relatively deep standing waters that were sheltered by overhanging trees and brush. Optimal times to search for gravid females were evenings, in light rain. Because gravid females tended to go to areas beyond their typical daily habitat to lay eggs, roadsides and open areas, adjoining favored aquatic habitats were also searched. A key element in the search for females was to listen for the calls of male *R. pipiens*, which tended to reside in the shallow regions of their aquatic environment. While females typically preferred deeper waters, they came to the shoreline in response to male vocalization during the breeding season.

The order in which the sampling locations in the target areas were sampled was flexible, yet systematic, with the objective of collecting frogs from all sampling locations. The goal in

collecting frogs from multiple sampling blocks was to ensure that target frogs represented a range of exposures, thus supporting evaluation of COPC exposure response relationships. The reference and target site sampling locations selected are illustrated in Figures 1 and 2, respectively. Sampling locations ranged in sediment total PCB concentrations from 0.2 mg/Kg to 160.0 mg/Kg. Specimens were collected from nine different target sampling sites. Since no specimens were found, and thus, collected at each of the three originally designated reference sites, specimens were obtained from Carolina Biological Supply (Burlington, NC). These laboratory-cultured specimens were obtained in three separate sets designated as R1, R2, and R3. Due to the time required to process the specimens, including artificial fertilization, staggered shipment of the reference specimens was required to minimize holding times prior to processing. Collectively these specimens are referred to as external reference specimen in the remainder of this report.

All frogs were collected within as short a time frame as possible in order to reduce stress to the frogs that were caught early in the collection phase, and to minimize the possibility of premature release of eggs while in captivity. While females could be held in captivity for a period of up to several months, it was not advisable to extend this time frame. Since shipment of specimens to the lab was staggered, the sampling team continued with field collection efforts (as necessary) while the laboratory proceeded with evaluation of reproductive parameters and artificial fertilization.

Ideally, at least six female and six male frogs were collected from each sampling location, as practicable. The initial three internal reference sampling locations contained sediment PCB concentrations of 0.4 mg/Kg. Although no specimens were collected from these sites, sediment and water samples were collected for the culturing of the external reference specimens. Adult male and female *R. pipiens* were collected from each of nine target site sampling locations. Of the frogs collected per site, at least four frogs were used for the reproduction and development study, with the remaining specimens used for whole-body tissue residue (PCBs and other COPCs) analysis. In several cases, this approach provided a means of relating a reproductive response within the sampling location to a specific concentration of PCBs or other COPCs (Steel and Torrie, 1980; Hicks, 1982; Thompson, 1992). This design also allowed statistical

comparison between the reference and target sites. Additional specimens were collected, when possible, to allow for the following contingencies, all females collected were not gravid, injury or death of frogs during transport. Considering the required change in the experimental design that resulted from the unsuccessful artificial fertilization of the target site specimens as the result of poor reproductive condition, the adult whole body tissue residue concentrations could not be considered biologically-related to the various developmental endpoints evaluated throughout the study. However, it should be noted that the inability to relate adult body burdens to developmental endpoints was not an imperfection in the study design, but rather a manifestation of the poor reproductive condition of the target site native specimens. Further, the reproductive dysfunction observed in the native adults was a more substantial finding toxicologically and weighs appreciably more than the fact that several of the originally intended comparisons between adult body burdens and specific developmental endpoints could not be performed.

METHODS

Field Procedures

Methods of Frog Collection and Temporary Housing

The sampling team captured frogs using several techniques, including drift fences with pitfall traps. The frogs were delivered to the processing area (Weston Solutions Laboratory, Pittsfield, MA) in separate containers labeled with location, sex, and date of collection. Each frog was then placed into its own compartment in a 6 gal. Styrofoam cooler, lined with moist sphagnum moss, for shipment to the laboratory. Perforated lids were securely affixed to the coolers with duct tape to prevent escape and the coolers were labeled.

Prior to delivery to the laboratory, coolers containing 6 frogs each were maintained in air-conditioned rooms with temperatures ranging from 10 to 15°C (Weston Solutions Laboratory, Pittsfield, MA). Frogs were fed a daily diet of live crickets and water. The water used for maintaining the frogs during holding and transportation was collected from the locations in

which the frogs were collected. Additionally, the sphagnum moss was changed, as needed, and kept moist. Representatives of the laboratory (The Stover Group) were available at all times during the collection to assist in making decisions on sampling, if additional sampling locations were needed or the number of frogs requested could not be achieved for any reason. The external reference *R. pipiens* were collected in Vermont and shipped to Carolina Biological Supply (Burlington, NC). The frogs were housed in a temperature-controlled room (10-15°C) with an automatic watering system for a short period, prior to being shipped overnight to The Stover Group laboratory.

Collection of Sediment and Water Samples

Sediment and water column samples were collected at each of the sampling locations within both reference and target sites. Four grab samples of sediment were collected by field staff, in accordance with the methods specified in the Field Sampling Plan (Weston, 1998), at each location. The four grab samples were then composited into a one-gallon sample for each of the sampling locations within the study areas. A similar approach was used to collect water column samples, in which grab samples were composited and then split into 10 one-gallon samples for each sampling location. The water and sediment samples were used to culture the specimens during the developmental phase of the study. Duplicate samples were collected for analytical analysis, as necessary.

Sample Documentation and Labeling

Field notes were recorded in a logbook, in accordance with the field sampling plan (Weston, 1998). Each frog was identified in the logbook using a unique 16 digit sample identification number assigned by Weston Solutions (Pittsfield, MA). Sample nomenclature methodology was specifically described in the QAPP (Weston, 1999). The label coding system was not explained to biological laboratory personnel to ensure that they remained blind as to the origin of a given specimen. Global positioning system (GPS) data was collected so that the geographical coordinates of the collection locations were identified. Specific documentation of habitat within each location was provided using digitally collected images and written field observations. In

addition, analytical samples were recorded in a logbook using labeling consistent with that specified in the QAPP (Weston, 1999).

Sample Preservation and Shipping

Live female and male frogs were transported to The Stover Group via overnight commercial courier service in Styrofoam coolers lined with moist sphagnum moss and an excess of live crickets. The coolers were labeled and sealed with perforated sides and lids. Two signed and dated custody seals were placed on two sides of the cooler to ensure the specimens were not tampered with during shipment. Following artificial fertilization, all females that had been gravid were euthanized, frozen, and packaged for possible shipment to the analytical chemistry laboratory for tissue residue analyses. Males used in the artificial fertilization process were also euthanized following removal of the testes, frozen, and packaged for potential shipment to the analytical chemistry laboratory. Additionally, residual portions of the egg masses and testes were frozen and packaged with each respective carcass for possible tissue analysis.

Adult specimen, ovary samples, and water and sediment samples were shipped to the Weston Solutions (Pittsfield, MA) for submittal to the analytical laboratory (GERG) in dry, clean, perforated sample containers that were labeled in accordance with ERT/REAC SOP #2002 (EPA, 1994). The Styrofoam ice chests were placed into polyethylene bags (one sample per bag), which were then sealed and placed into U.S. Department of Transportation (DOT) approved fiberboard boxes lined with plastic sheeting, bubble wrap, and sufficient vermiculite to absorb any potentially leaking material. All outer packing materials were also perforated to allow gas exchange. One chain-of-custody form (in triplicate) was placed into a watertight bag and taped to the inside of the lid of each cooler. Specimens to be analyzed for analytical parameters, including PCBs, were packaged as described above following snap freezing in liquid nitrogen and inclusion of dry ice. In accordance with DOT regulations, the lids were slightly perforated to allow for release of carbon dioxide gas as the dry ice melted. In this case, the Styrofoam coolers were then placed into cardboard boxes that had also been perforated to allow gas release. The boxes were securely taped and appropriately labeled, according to the courier's protocols. International Civil Aviation Organization regulations stipulated that any volume of

dry ice was a Class 9 Miscellaneous Hazardous Good (IATA, 1993). In order to provide a means by which the entire path of a sample could be traced, a chain-of-custody record was maintained from the time a sample was collected through analysis, as specified in the QAPP (Weston, 1999).

Laboratory Procedures

A synopsis of the sampling locations, and sediment and water samples used in the culture of specimens collected during the present study is provided in Appendix A. The laboratory procedures are described in the following sections.

Artificial Fertilization

After allowing female frogs to acclimate for at least 24-h following receipt by The Stover Group, female frogs were induced to ovulate and the egg masses were stripped and fertilized, if possible *in vitro*. It was only upon stripping the eggs that a definitive determination of gravidity was made. The number and identity of gravid versus non-gravid females was recorded for a subsequent analysis. In addition, the number of eggs produced by each female was specifically counted in representative ovary sections.

Super-ovulation was induced by injection of the equivalent of approximately 100 IU of luteinizing hormone releasing hormone (LHRH) in the form of leopard frog pituitary extract (Carolina Biological Supply, Burlington, NC) in 1 mL of spring water using a tuberculin syringe with ½-inch-long 26 gauge needles, in accordance with methods cited in Parris (1999), Parris et al. (1999), Parris et al. (2001), Porter and Licht (1985), Bantle et al. (1998), Fort and Stover (1995 and 1996a), and ASTM (1998). The females were carefully immobilized prior to injection by holding them underneath an aquarium net. One mL of the reconstituted pituitary extract was injected into the dorsal lymph sac, which was bound by the lateral line that runs along the side of the frog and appeared as stitching on the skin. Care was taken to inject the frog sub-cutaneously by wrinkling the skin.

The testes from male frogs from each location were removed and the specimens were sacrificed. Testes from each male were gently mashed together in a Petri dish containing 9 mL of spring water. A 1 mL aliquot of the resultant sperm solution was checked for sperm count, motility, and dysmorphology under a microscope (Fort et al., 1999). Approximately 24-36 hours after the females were injected with pituitary extract, egg masses were gently squeezed out of the females into the concentrated sperm solution by firmly grasping the frog, extending the legs back and close to each other, and applying gentle pressure on the abdomen.

Sperm solutions prepared from the testes of these males were used to fertilize eggs from each respective female from a given sample site. Egg masses were squeezed out of the females into the concentrated sperm solution by firmly grasping the frog, extending the legs back and close to each other, and applying gentle pressure on the abdomen. After standing in the sperm solution for 30-45 minutes, the eggs were flushed with culture water and were loosely separated to minimize crowding. After 2-h the eggs were checked for fertility and quality. Grey crescents that form on the opposite side of sperm entry, immediately above the equator, dividing the animal pole from the vegetal pole, was the first sign of fertilization. Normal cleavage (indicating successful fertilization) was determined based upon the general technique of Nieuwkoop and Faber (1994) and Dickerson (1969). Since cellular development can be observed, early embryogenesis was also monitored. Egg masses characterized by significant infertility were recorded relative to the origin of the female, so that differences in fertility rates would subsequently be evaluated.

Early Developmental Monitoring and Evaluation of Metamorphosis: Field Collected Egg Masses and Larvae

The origins of specimens used for the developmental studies included artificially fertilized egg masses from the external reference specimens, egg masses from sites W-7a, W-4, and W-1 (18.0, 0.5, and 0.2 mg/Kg total PCBs, respectively), and newly hatched larvae from sites W-6 and EW-3 (42.0 and 30.0 mg/Kg PCBs, respectively). No developmental studies were conducted on target sites E-5, W-9a, W-8, and E-1; no specimens were found at sites E-5 and W-9a (37.0 and 4.3 mg/Kg total PCBs, respectively), only 1 larvae was found at site W-8 (120.0 mg/Kg total

PCBs), and only salamander egg masses were found at site E-1 (160.0 mg/Kg total PCBs). Regardless of the type of *R. pipiens* specimens collected or their origin, larval specimens were placed intact into test vessels for culture in accordance with the following design scenario for each site.

- Site W-7a (18.0 mg/Kg total PCBs) One field-collected egg mass with newly post-hatch larvae placed into 4 separate culture chambers (n=30, 25, 25, and 25). Replicates not independent;
- Site W-6 (42.0 mg/Kg total PCBs) Field-collected newly post-hatch larvae placed into 4 separate culture chambers (n=25, 25, 25, and 23). Replicates not independent;
- Site W-4 (0.5 mg/Kg total PCBs) Two field-collected egg masses with newly posthatch larvae placed into 4 separate culture chambers (n=30, 25, 25, and 25) for each egg mass. Two independent replicate sets;
- Site EW-3 (30.0 mg/Kg total PCBs) Field-collected newly post-hatch larvae placed into 1 culture chamber (n=10);
- Site W-1 (0.2 mg/Kg total PCBs) One field-collected egg mass with newly post-hatch larvae placed into 4 separate culture chambers (n=30, 25, 25, and 25). Replicates not independent; and
- R3 external reference specimens Two separate artificially fertilized egg masses with newly post-hatch larvae placed into 4 separate culture chambers (n=20, 20, 20, and 20) for each egg mass, (2 independent replicate sets).

In this study, the age difference between the field-collected egg masses, field-collected larval specimens, and external reference larvae was considered insignificant with respect to the overall interpretation of the effects data. In the case of the field-collected egg masses or larvae, the specimens were approximately the same age (\pm 2-3 d) and were subjected to comparable exposure conditions in the field prior to collection.

Since the primary source of contaminant to the developing embryos could not be assumed to be maternal transfer during oogenesis and egg maturation, it was necessary to add target site or

reference site water and sediments to the test vessels. Fertilized egg masses were transferred to 4 replicate, 4 L exposure chambers (20 per replicate vessel) for monitoring throughout metamorphosis. Teflon® mesh inserts were inserted into the exposure vessel at the sediment/water interface prior to the addition of the larvae. Approximately 200 g of sediment (wet weight) was placed in the bottom of each 4 L container, the exposure inserts added, and the vessels filled with 3 L of site water. This represented a 1:15 dilution of sediment to dilution water. Although this ratio of sediment to water was less than that typically used in similar studies (Fort and Stover, 1997b), the high amount of decaying organic material in the sediment samples made it physically impossible to achieve a greater ratio of sediment to water. Test chambers containing embryos from reference and target areas were discretely labeled and then randomly distributed on shelves in a temperature controlled room. Laboratory test vessels were labeled with the appropriate sample numbers. Laboratory personnel were blind to the origin of each sample with respect to contamination levels. A pH range of 7.0-8.5 and a temperature of 23±1° C was maintained in the cultures. Although each culture vessel was aerated, dissolved oxygen was monitored and was not allowed to drop below 6.0 mg/L. The test chambers were maintained on a 12-h day/12-h night cycle. Renewal of test solutions and sediments during this longer-term development phase will be performed every seven days (weekly). Dead embryos were removed, counted, and recorded daily. During the culture phase, digital images of the developing larvae were recorded during the renewal process both for observation of the developing limbs and resorbing tail, as well as photographic documentation of the results, in accordance with the methods for Fort and Stover (1996b), Fort and Stover (1997a), and Fort et al. (1999a).

In order to determine the role of transgenerational (maternal) PCB and other COPC transfer on developmental effects induced in target site embryos/larvae, a separate set of experiments was performed concurrently. In these studies, an additional set of at least 120 artificially fertilized embryos from external reference females were exposed to water and sediment from a site containing elevated levels of sediment total PCBs (sample site W-8 [120.0 mg/Kg sediment total PCBs]), and developmental effects (hatching and metamorphosis) monitored as described in this section. Additional embryos from external reference females were also cultured in reference site water and sediment (site MP [0.04 mg/Kg sediment total PCBs]) for comparison to the target

site. The reverse cross over experiment was not conducted due to the lack of fertilized embryos from a highly contaminated site location. However, an Aroclor 1260 reference sediment spiking experiment, in which artificially fertilized embryos from the external reference specimens were cultured in reference site water and sediment (site MP) spiked with 30.0 mg/Kg Aroclor 1260, was performed to help confirm the effects of PCB contaminated sediment on embryo-larval development.

The embryos were expected to hatch within 7-10 days (Gosner, 1960). Developing embryos/larvae were not fed during the seven-day pre-hatch observation period, since the yolk sac that remained following hatching provided sufficient nourishment for the first 7-8 days. Following hatching (longer-term evaluation), larvae were fed Salmon Starter fish food, which had been successfully used to culture *Rana* tadpoles in the laboratory (Carolina Biological Supply Company, 1993). The following specific abnormalities were recorded: gut, hemorrhaging, axial malformations, blistering and edema; and the malformation of the head, face, eye, heart, and brain.

Analytical Analyses

(GERG) was responsible for conducting the following COPC tissue analyses, total PCBs, Aroclor-specific PCBs, dioxins and furans, PAHs, and Appendix IX pesticides and metals. Tissues from a whole body adult composite (n≥2, typically 3 to 4 individuals, both male and female), individual females (offal sample, ovaries removed), an ovary/egg mass sample from the individual females, and one embryo/larval sample per sampling location were analyzed. In addition, composited water and sediment from each sample site location were analyzed for the parameters indicated above, as well as, general water quality measurements for the composited water samples.

DATA ANALYSIS

Data Collection

For embryo-larval and limb development; mortality, malformation, and growth rates were determined for the test site and external reference specimens, using a dissecting microscope (Fort et al., 1995, 1996b and 1997a; ASTM, 1998). For monitoring the rate and extent of metamorphosis, video images were captured using a Sony CCD-iris high-resolution color digital video camera. A Pentium 233 MHz computer with image processing software and a FlashPoint 128 (Integral Technologies, Inc., Indianapolis, IN) video frame grabber was used to digitize head-to-tail lengths throughout the study. A ruler videotaped with the larvae was used to correct for image distortion and calibrate the length-measuring program to ensure accurate measurements of the larvae. Head-to-tail lengths were measured using Sigma Scan software (SPSS, Corte Madera, CA).

As an initial step in the evaluation, a database was developed for the target and reference areas. This database was developed in spreadsheet/database format and sorted by sample site and endpoint measured at the individual level. For the reproductive endpoints, the database included the following information: identification number of the male and female frogs, gravidity, egg mass, necrosis, portion in respective oocyte stages, number of eggs, sperm counts and sperm morphology, and adult tissue residues. In terms of the developmental endpoints in the field-collected specimens cultured in the laboratory, the database included: field-collected egg mass or larvae sample identification number, mortality incidence, abnormality incidence by type of deformity and total number, limb mal-development, rate of and abnormalities occurring during metamorphosis, and larval tissue residues.

The accuracy of the data entry was evaluated prior to statistical evaluation. In order to streamline the scope of analysis, evaluation of the data sets in this report was based on total PCB, total dioxins and furans, total PAHs, and total Appendix IX pesticides and selected metals.

Statistical Analysis

Hypothesis Testing

Statistical evaluations of differences in outcomes between respective crossover study treatments, or treatments associated within the Aroclor 1260 spiking study, were evaluated based on homoscedastic t-tests (1 tail, 0.05), providing the data sets were found to be normally distributed with homogeneous variance using ToxCalc 5.0 (Tidepool Scientific Software, 1994). Proportional data was transformed using an arcsine square root transformation prior to formal statistical evaluation. Normality of data set distributions was determined by the Shapiro-Wilks test. For non-normally distributed data sets, non-parametric tests, such as the Wilcoxon Two Sample test (1 tail, 0.05) and Kruskal-Wallis one-way ANOVA (P=0.05), were used. To be ecologically conservative, no adjustment to the significance level was performed during this analysis. Conclusions based on the hypothesis test were further examined with respect to biological significance.

Correlation Analysis

Relationships between various biological effects observed and tissue and sediment total PCBs were evaluated using Spearman's Rank Order Correlation matrices (two-tailed test, 0.05). Data from the reference sites, which used external reference *R. pipiens*, were excluded from the concentration-response evaluations. As with the hypothesis tests, data sets were evaluated for normality prior to analysis.

QUALITY ASSURANCE/QUALITY CONTROL

Data Quality Indicators and Assessment

As previously indicated, the primary objective of this study was to assess the impact of PCB and other COPC exposure on frog reproduction and development. Overall, this study attempted to determine the effect of PCB exposure to sexually mature adult *R. pipiens* on reproductive

capacity and developmental fitness in their progeny by comparing a series of biological and toxicological indicators in specimen obtained from an uncontaminated source (external reference specimens) and contaminated areas (target sites). As previously indicated, the present study was unable to meet the stated objective of comparing reproductive fitness in the adults to developmental effects in the progeny. However, this was not the result of a design weakness, but rather the magnitude of biological effects on adult reproduction, eliminating the possibility of direct study links to developmental responses. However, regardless of study outcome, the following data and specific quality assurance criteria were required. Procedures were established to ensure the accurate collection of the following data.

Data Quality Objectives

Data developed in the frog reproduction and development study had to meet acceptable standards of precision, accuracy, completeness, representativeness, comparability and sensitivity, as defined in Section 15 of the QAPP (Weston, 1999). Each of these data quality indicators, some of which were not readily quantifiable for data associated with this study, is discussed below.

Precision was defined as the level of agreement among repeated independent measurements of the same characteristic. Because of the biological heterogeneity inherent in *R. pipiens* communities, it was not possible to take repeated independent measurements of the biological parameters. Precision was also evaluated by the assessment of the degree to which sample collection procedures were able to ensure collection of a consistent number of samples. For measurements that were not unique to the frog reproduction and development study, such as water and sediment chemistry and tissue residues, precision was evaluated as defined in the QAPP (Weston, 1999).

Accuracy was defined as the agreement of a measurement with its true value. For the parameters unique to this study, accuracy was defined as meaning that the test metrics were correctly determined in each sample, correctly enumerated, and correctly recorded. Accuracy of each test metric was a function of each sample being processed, reviewed, and recorded, and of consistent field sampling techniques. The data generated by this study were evaluated for accuracy via

comparison with known and/or expected results from similar studies conducted in the Housatonic River or in similar ecosystems, although a limited number of comparable studies were currently available. For parameters such as water and tissue residue and sediment contaminants, accuracy was as defined in the QAPP (Weston, 1999).

Completeness was defined as the percentage of the planned samples actually collected and processed. Completeness was evaluated for all components of the frog reproduction and development study. To ensure achieving the planned statistical resolution, it was important that completeness, reasonably near 100%, be achieved for all components of this study, with the exception of the tissue residue analyses. The minimum sample size required to complete this study, based on the anticipated test metric variance, was approximately 30 males and 30 females for the study. Thus, approximately 3 male and 3 female frogs needed to be collected per site. For the tissue analysis study component, the material available for collection determined the number of analyses, and establishment of an *a priori* completeness goal was not possible.

Representativeness referred to the degree to which the data accurately reflected the characteristics present at the sampling location, at the time of sampling. This data quality indicator was addressed through implementation of proper sampling design, sample processing methods, and sample analysis, which were evaluated via comparison with known and/or expected results.

Comparability was a measure of the confidence with which the frog reproduction and development data could be compared to another similar data set. Comparability was evaluated for this data set through comparison with known characteristics of *R. pipiens* communities in similar ecosystems in the Northeast (Woodlot Alternatives, 2001).

Sensitivity, the ability of a measurement technique or instrument to operate at a level sufficient to measure the parameter of interest, was difficult to apply to the biological parameters associated with this study. Frog reproduction, development, and maturation represented sensitive indicators of frog health and fecundity. The ability of the test metrics, designed in this study to determine potential changes in reproductive capacity or developmental fitness relative to

corresponding tissue COPC residues or sediment COPC levels, was the primary determinant of the sensitivity of this model system. Sensitivity of analytical analyses alone was described in the QAPP (Weston, 1999).

Data Validation, Verification, and Usability

Procedures for data validation for the chemical and physical data were discussed in various sections of the project QAPP (Weston, 1999) and were used whenever applicable in this study. For the biological data, usability was largely determined by three factors: (1) the experience of the principal investigators in establishing that the field sampling was conducted using appropriate techniques and that accuracy and precision were not compromised by an inability to control the sampling procedures in the field; (2) an evaluation of the toxicological data as compared with previous studies; and (3) a direct comparison between the analytical chemistry and tissue residue data and similar data collected by other studies from similar areas of the river. The purpose of the remainder of this section is to document the measures included in the study to ensure that the standards discussed above were met.

Sample Analysis

Laboratory Studies

Processing of the frogs for artificial fertilization, early developmental monitoring, and evaluation of metamorphosis followed procedures established in the preceding sections. All samples were processed by experienced staff, trained in this area, and whose work their supervisors and peers periodically checked. Methods of QC for each metric evaluated were addressed in the DQOs. Each analysis was repeated until consistent results were obtained (i.e., two separate egg counts within a given specimen should fall within 10% of one another). Verification by a separate analyst was also used to authenticate the results. Corrective action, including reprocessing of samples and retraining of staff, was instituted if these QC checks produced unsatisfactory results.

Physical/Chemical Samples

Samples for water and sediment chemistry and tissue residue analysis were processed following procedures and SOPs provided in the project-wide QAPP (Weston, 1999). These samples were submitted in catalogs and batches with other samples from the larger project, and data validation was performed on a catalog basis in accordance with procedures established and described in the QAPP (Weston, 1999).

Data Analysis and Reporting

Data collection, statistical analysis, and reporting for this study were also described in preceding sections. This final report including all data, analyses, and interpretations, was prepared with specific reference to both the DQOs of the specific protocol for the frog reproduction and development study and section 4.1 of the project-wide QAPP (Weston, 1999).

RESULTS

SAMPLE COLLECTION

As previously mentioned, no adult specimens were found in the three internal reference sites, WML, MP, and TP. Overall, considerable difficulty in locating and collecting specimens from the reference sites, and thus, meeting criteria established in the Materials and Methods section, was encountered during the present study. Thus, the use of external reference specimens (R1, R2, R3, and R4) purchased from Carolina Biological Supply (Burlington, NC), a commercial supplier specializing in aquatic biological field specimens for laboratories, was warranted to meet the established criteria. As indicated in the Materials and Methods Section, the term "External Reference Specimens" refers specifically to reference or control specimens collected from a location outside the designated study area. The designations "R1, R2, and R3" represented the first, second, and third sets of external reference adult R. pipiens (male and female) and any of their progeny. R1, R2, and R3 specimens were verified by Carolina Biological Supply as adult R. pipiens collected in Vermont. The designation "R4" referred to external reference egg masses artificially fertilized at Carolina Biological Supply and shipped overnight to The Stover Group laboratory. The origin and species of the female frogs producing the egg masses were confirmed by Carolina Biological Supply as being R. pipiens collected in southern Canada. It should be noted that only the reference specimens were obtained from an outside source. All water and sediment samples designated as reference site and used for the culture of artificially fertilized external reference specimens were collected from reference site MP. External reference specimens cultured in reference site MP sediment and water were used as a means of providing baseline data from a healthy population and were not used in evaluating any correlation analysis.

In summary, 18 female and 18 male *R. pipiens* (external reference specimens) were received from Carolina Biological Supply (Burlington, NC). Fifty-seven adult female and 51 adult male *R. pipiens* were collected from the target region. At least 6 specimens of each sex were found at each of the target sampling locations, with the following exceptions. Only 2 female specimens

and no male specimen were found at site E-5. In addition, 5 female and 5 male specimens were found at site W-4. Five male specimens were also collected at site W-7a. Chain-of-custody documentation, complete chemical analyses, reproductive-phase sample inventory lists and data tables, developmental-phase sample inventory list and data tables, and the project photo atlas are provided as Appendices B-F, respectively.

WATER QUALITY CHARACTERISTICS

Results of water quality characterization of samples collected from the pools during field collection and samples collected for the culturing portion of the developmental studies are reported in Table 1. Generally, aquatic habitats suitable for amphibians are of low to moderate hardness with near neutral to slightly alkaline pH, and adequate levels of dissolved oxygen (>4.0 mg/L). Little is currently known about trace mineral requirements, although the presence of calcium, magnesium, and potassium appear to be important. Excessive levels of ammonia and nitrite can be deleterious. However, the water quality characteristics of the various sampling locations were reasonably consistent with normal habitat requirements for *R. pipiens*.

WATER AND SEDIMENT TOTAL PCB ANALYSIS

Results of water and sediment PCB analysis are provided as Appendix C. A summary of these results is presented in Table 2. It should be noted that the sediment chemistry data presented for the present studies represented discrete values taken from a single sampling site. These data were collected in support of the two amphibian ecotoxicological studies. No sediment data collected prior to the initiation of the two amphibian studies were included in the sediment chemistry values presented in either developmental determinations of contaminants effects on amphibian populations (i.e., spatially weighed vernal pool and backwater habitat data in the evaluation of concentration/response relationships), but use of additional data in the interpretation of relative risk of COPCs is beyond the scope of these reports. All PCB values were reported as dry weight for sediment samples and wet weight for tissue samples. The initial sediment total PCB levels (samples collected on 3/30/2000 for target sites and 5/24/2000 for

reference site MP) ranged from 0.04 mg/Kg at reference site MP to approximately 160.0 mg/Kg at target sampling site E-1. The remaining sampling location total PCB levels were approximately 0.2, 0.5, 4.3, 18.0, 30.0, 37.0, 42.0, and 120.0 mg/Kg at sites W-1, W-4, W-9a, W-7a, EW-3, E-5, W-6, and W-8, respectively.

Although water total PCBs from each of the test and reference sites were not used in the analysis of the present data, water total PCB levels measured at target sites E-5, W-9a, w-8, W-7a, W-6, W-4, EW-3, E-1, and W-1 were 4.3x10⁻⁵, 1.3x10⁻⁵, 1.4x10⁻⁴, 3.0x10⁻⁵, 2.2x10⁻⁴, 1.3x10⁻⁵, 4.1x10⁻⁴, 2.4x10⁻⁴, and 1.3x10⁻⁵ mg/L, respectively. The water total PCB concentration at reference site MP was 1.3x10⁻⁵ mg/L. Sediment and water total PCB results for reference sites WML and TP were not provided. Also, any additional congener analytical results for sediment and water samples were not provided. Water total PCB measurements were not included in data analysis, as the water data are not relevant to the larval developmental endpoints. Water samples were collected during the collection of the adult animals. Additional water samples were not collected during the field-collection of egg masses. Therefore, comparison of larval development to these water data was not biologically relevant.

REPRODUCTIVE EVALUATION AND ARTIFICIAL FERTILIZATION

Adult Tissue Residue Analysis

Tissue residue analyses from the adult female specimens during the present studies are summarized in Table 2. Complete results of tissue analyses are included as Appendix C. As previously indicated, although more extensive chemical analyses were preformed, evaluation of the relationship between COPCs and biological effects were based on total PCB, total dioxins and furans, total PAHs, total Appendix IX pesticides and metals; Al, As, Ba, Be, Cd, Cr, Cu, Fe, Pb, Mg, Mn, Hg, Ni, Se, Sr, V, and Zn. Total PCB levels were measured in adult whole bodies composited within each site (labeled as Adult Chemical Analysis Specimens), ovary samples from two adult female specimens from most of the sites, and corresponding offal samples from the preceding two specimens from which ovary samples were collected (both labeled as Adult

Experimental Analysis Specimens). Only one ovary and offal sample was collected from specimens from sites W-6 (42.0 mg/Kg sediment total PCBs). No ovary and offal samples were analyzed from sites E-5, W-8, W-4, and E-1 (37.0, 120.0, 0.5, and 160.0 mg/Kg sediment total PCBs). Three sets of ovary and offal samples were analyzed from R3 external reference specimens. Appendix IX pesticides and metals, dioxins and furans, and PAHs were also measured in the offal samples collected from each site.

A comparative illustration of tissue total PCB levels and the relationship between sediment total PCBs and tissue total PCB concentrations from the various sampling sites is presented in Figure 3 and 4, respectively. Total PCBs in whole body composites ranged from 0.01 to 0.04 mg/Kg in the reference specimen females (R1-R3). Whole body total PCB levels in the target site specimens ranged from 0.15 mg/Kg in site W-1 (0.15 mg/Kg sediment total PCBs) specimens to 5.39 mg/Kg in composited specimens collected from site W-8 (120 mg/Kg sediment total PCBs).

Ovary tissue samples ranged from 0.008 to 0.04 mg/Kg in the external reference specimens to 0.24 mg/Kg in specimens from site W-1 (0.15 mg/Kg sediment total PCBs) to 45.1 mg/Kg in specimens from site W-9a (4.3 mg/Kg sediment total PCBs). Heterogeneity in ovary total PCB concentrations were found in specimens collected from the more highly contaminated sites compared to the lesser-contaminated sites. For example, total PCB levels in ovary samples collected from two different specimens from sites W-9a (4.3 mg/Kg sediment total PCBs) and W-7a (18.0 mg/Kg sediment total PCBs) ranged from 0.57 mg/Kg to 45.1 mg/Kg and 1.63 mg/Kg to 26.8 mg/Kg, respectively. However, little heterogeneity in results was found in ovary tissue collected from specimens from site W-9 (0.24 and 0.29 mg/Kg), which contained lower sediment total PCB levels (0.15 mg/Kg sediment total PCBs).

Overall, offal total PCB levels in the specimens sampled were markedly lower than the corresponding ovary total PCB levels. Offal total PCB levels in the reference specimens sampled ranged from 0.001 to 0.03 mg/Kg. Offal levels in target site specimens ranged from 0.01 mg/Kg measured in specimens from site W-1 (0.15 mg/Kg sediment total PCBs) to 2.56 mg/L found in specimens collected from site W-7a (18.0 mg/Kg sediment total PCBs). As noted

with ovary total PCB levels, offal total PCB concentrations measured in target site specimens varied more than in specimens from the less contaminated sites and the reference specimens.

Appendix IX pesticides and metals, dioxins and furans, and PAHs were also measured in one offal sample from a reference specimen, as well as, specimens from sites W-9a, W-7a, EW-3 (two samples), and W-1 (4.3, 18.0, 30.0, and 0.15 mg/Kg sediment total PCBs). Total Appendix IX pesticide levels in the reference offal samples ranged from 5.6 to 29.3 μg/Kg. Total Appendix IX pesticide levels in target site offal samples ranged from 8.9 to 31.1 μg/Kg. Total dioxin/furan levels in reference offal samples ranged from non-detected (ND) to 127.7 ng/Kg; whereas, offal samples from target site specimens ranged from ND to 21.3 ng/Kg. Total PAH levels in reference offal samples ranged from 37.7 to 127.7 μg/Kg. Total PAH levels in target site offal samples ranged from 27.9 to 62.1 μg/Kg. Cd, Pb, and Hg levels in reference offal specimens ranged from 0.13 to 0.25 mg/Kg, 0.12 to 0.28 mg/Kg, and 0.07 to 0.14 mg/Kg, respectively. Ni was not detected in the reference offal samples. Cd, Pb, Hg, and Ni levels in offal samples collected from target site specimens ranged from 0.17 to 0.43 mg/Kg, 0.29 to 0.97 mg/Kg, 0.20 to 0.31 mg/Kg, and ND to 0.56 mg/Kg, respectively. The levels of Appendix IX metals were relatively low, not appreciably different between target site and reference specimens.

Reproductive Metrics

Specimen inventory lists and data tables collected from the reproductive studies are provided as Appendix D. It should be noted that the adult external reference specimens were not exposed to the same environmental stressors that the adult specimens collected from within the lower Housatonic River watershed were exposed. Therefore, adult external reference specimens were used only as a point of reference, and not for statistical analysis, in the reproductive study.

For this study, females were considered juvenile if their weight was <20 g. Since female leopard frogs typically are reproductively mature during their second year (ca. 20-30 g), this designation was appropriate and consistent with Stebbins and Cohen (1995), Gilbert et al. (1994), and

Merrell (1977). Males become sexually mature earlier and many reproduce during their first year (ca. 10-20 g). Thus, males <10 g were considered juveniles. In the present study, none of the males collected were juveniles and all juvenile females were excluded from analysis.

Whole Body Weight, Ovary Weight, and Testis Weight

Mean female whole body weight of the specimens collected from the target sites and reference specimens is presented in Figure 5. A general trend in reduced female body weight was observed in specimens collected from the target site locations when compared to the external reference specimens. The relationships between sediment total PCBs, whole body (Adult Experimental Specimens) total PCBs, or ovary total PCBs; and female whole body weight (Adult Experimental Specimens) is provided in Table 3.

Mean male whole body weight of the specimens collected from the target sites and reference specimens is presented in Figure 6. Unlike the female specimens collected, a general trend in reduced male whole body weight was not observed in specimens collected from the target site locations when compared to the external reference specimens with the exception of site W-4 (0.5 mg/Kg sediment total PCBs).

Mean female ovary weights of the specimens collected from the target sites and reference specimens are presented in Figure 5. As was found with whole body weights, a general trend in reduced ovary weight was observed in specimens collected from the target site locations when compared to the external reference specimens. Mean ovary weight, expressed as percent of whole body weight, was nearly 30% in reference specimens (R1-R3), whereas, with the exception of site W-7a (8.0 mg/Kg sediment total PCBs) specimens (ca. 22% of total body weight), the mean ovary weight of the remaining target site specimens was ≤7% of the total body weight. The relationship between sediment total PCBs, whole body (Adult Experimental Specimens) total PCBs, or ovary total PCBs; and ovary weight (as % total body weight) is provided in Table 3.

The mean testes weight, expressed as % of the body weight, of the specimens collected from the target sites and reference specimens are presented in Figure 6. The mean testes weight in specimens collected from sites W-8, E-1, W-4, and W-7a (120.0, 160.0, 0.5, and 18.0 mg/Kg sediment total PCBs, respectively) were 0.079, 0.102, 0.089, and 0.096% of the mean body weight, respectively. The mean testes weight, expressed as % of the body weight, of the external reference specimens was 0.176% for R1, 0.106% for R2, and 0.142% for R3.

Gravidity

Gravidity was a subjective assessment of reproductive status in the adult female as marked by the presence of mature eggs. Externally, gravidity was determined by assessing the degree of distension of the ovaries, determined by gently squeezing the flanks of the female. Since, this measure of reproductive status was subjective, it was confirmed by a specific examination of the ovaries and oocytes. Only external reference female specimens were found to be gravid by formal definition. For the external reference specimens R1, R2, and R3, 100% of the females evaluated (n=13) were found to be gravid. However, several female frogs collected from sites W-7a, W-6, W-4, EW-3, and W-1 (18.0, 42.0, 0.5, 30.0, and 0.2 mg/Kg sediment total PCBs, respectively) were found to be "slightly gravid". In this case, a slight distension in the ovaries was noted. Without the specific examination of the ovaries or egg masses, it would have been impossible to determine whether the "slightly gravid" specimens were reproductively fit. None of the female specimens collected from E-5, W-9a, W-8, and E-1 (37.0, 4.3, 120.0, and 160.0 mg/Kg sediment total PCBs, respectively) were found to be gravid.

Oocyte Characteristics

As oocytes mature, they grow in size and weight. Thus, oocytes that were mature and ready for fertilization typically weigh more than immature oocytes. An alternative means of expressing the total number of oocytes, in a given female specimen, was the number of oocytes per g of ovary tissue. Thus, a lower mean total oocyte value normalized to ovary tissue weight, in some cases, reflected a greater level of oocyte maturity in the ovary. Obviously, this assessment required confirmation by specific examination of the oocyte stage distribution. The mean total

number of oocytes present in the external reference females and female specimens from each of the target sites is presented in Figure 7. The relationship between sediment total PCBs, whole body (Adult Experimental Specimens) total PCBs, or ovary total PCBs; and oocyte density is given in Table 3. It should be noted that due to overall immaturity of the oocytes, resulting in the inability to acquire adequate total egg counts for many of the specimens examined, this data set was somewhat more limited than the other reproductive test metric data sets.

The specific stage distribution of oocytes from females collected from the external reference specimens and each of the sampling locations within the target sites is presented in Figure 8. In this assessment, oocytes were staged as being immature (< stage III), of increasing maturity (≥ stage III), or mature and ready for fertilization (stage VI). The reference specimens demonstrated a distribution of oocytes stages, however over 80% were stage III or greater and over 70% were stage VI. These specimens were reproductively fit and capable of producing offspring. Maturing oocytes (≥ stage III) were found in females at target site sampling locations W-7a, W-4, and EW-3 (18.0, 0.5, and 30.0 mg/Kg sediment total PCBs, respectively). It should be noted that a reasonable proportion of maturing oocytes was also found in ovaries from females collected at site W-1 (0.2 mg/Kg sediment total PCBs). Only traces of mature oocytes were identified in females from target site sampling locations W-7a, W-4, EW-3 (18.0, 0.5, and 30.0 mg/Kg sediment total PCBs). The relationship between sediment total PCBs, whole body (adult experimental) total PCBs, or ovary total PCBs; and the proportion of immature (< Stage III) oocytes is presented in Table 3. The greatest proportion of mature oocytes found in target site females was ca. 5% from site W-7a. The proportion of stage VI oocytes in the external reference females ranged from 55% to nearly 90%. The relationship between sediment total PCBs, whole body (adult experimental) total PCBs, or ovary total PCBs; and the proportion of mature oocytes (Stage VI) is provided in Table 3. Correlation analysis suggested that ovary tissue total PCBs and proportion of stage VI oocytes were significantly negatively correlated (Spearman's Rank Correlation, 2-tailed test, 0.05, n=7, r=-0.86).

Overall, these results suggested that females collected from the target site sampling locations were not as reproductively fit as the external reference females, which were readily capable of reproducing. Further, the PCB and other COPCs that accumulated in the ovary tissue primarily

accounted for the reproductive stress observed in females collected from target site sample locations

Sperm Characteristics

Results of sperm characterization of the external reference and target site male specimens are presented in Figure 9. Sperm counts from external reference males (R1-R3) were approximately 5.6 x 10⁶ sperm/g tissue. The sperm counts from males collected at sites W-8 and EW-3 were less than 6.1 x 10⁵ sperm/g tissue. Mean sperm counts in specimens collected from sites W-9a and W-6 (4.3 and 42.0 mg/Kg sediment total PCBs, respectively) were 2.4 x 10⁶ and 2.0 x 10⁶ sperm/g tissue, respectively. The relationship between sediment total PCBs and sperm count is expressed as analysis 13 of Table 3. The greatest rates of sperm cell abnormality, 37%, 42%, and 49%, were recorded in samples from sites W-6, W-8, and EW-3, (42.0, 120.0, and 30.0 mg/Kg sediment total PCBs), respectively. Sperm abnormalities were primarily localized to the anterior neck region and posterior head region resulting in varying degrees of axial flexure of the sperm tail. Overall, these results suggested that males collected from the target site sampling locations demonstrated signs of reproductive stress.

EMBRYONIC AND LARVAL DEVELOPMENT, GROWTH, AND MATURATION

Tissue Residue Analysis

Tissue residue analyses from larval specimens cultured in the laboratory derived from egg mass or larval specimen samples collected from several target site sampling locations, or reference larvae raised from artificially fertilized egg masses in the laboratory are summarized in Table 2. Overall, a limited number of egg masses were found at the target site sampling locations. As previously discussed, egg masses were collected from sites W-7a, W-4, and W-1; and larvae were collected from sites W-6 and EW-3. Complete tissue analysis results are provided as Appendix C. Total PCB levels were measured in one laboratory cultured larval sample from

each of sites W-7a, W-4, and W-1 (18.0, 0.5, and 0.2 mg/Kg, respectively), and sites W-6 and EW-3 (42.0 and 30.0 mg/Kg sediment total PCBs, respectively), respectively. Appendix IX pesticides and metals, dioxins and furans, and PAHs were not measured in these samples. Thus, analyses comparing biological response to COPCs were limited to total PCBs. The total PCB level in larvae cultured from artificially fertilized reference egg was 0.01 mg/Kg. Larval samples cultured in the laboratory in their respective site water and sediment from egg masses collected from sites W-7a, W-4, and W-1 (sites 34, 36, and 39, respectively) ranged from 0.05 mg/Kg (site W-1 [0.2 mg/Kg sediment total PCBs]) to 1.4 mg/Kg (site W-4 [0.5 mg/Kg sediment total PCBs]). Larval stage samples collected from laboratory cultures of field-derived larvae from sites W-6 (42.0 mg/Kg sediment total PCBs) and EW-3 (30.0 mg/Kg sediment total PCBs) contained 0.7 and 1.0 mg/Kg total PCBs, respectively. Contaminant exposure scenarios for the reference specimens exposed to target site W-8 (120.0 mg/Kg sediment total PCBs) and reference site MP (0.04 mg/Kg sediment total PCBs) water and sediment; and reference site MP water and sediment spiked with 30.0 mg/Kg Aroclor 1260 is provided as Appendix A. Reference larvae collected from artificially fertilized egg masses cultured in control water contained whole body total PCB levels of 0.04 to 0.07 mg/Kg. Reference larvae collected from artificially fertilized egg masses cultured in site W-8 water and sediment contained 0.4 mg/Kg total PCBs (Figure 10). Reference larvae collected from artificially fertilized egg masses cultured in control water and sediment, reference site MP water and sediment, and reference site MP water and sediment spiked with 30.0 mg/Kg Aroclor 1260 contained whole body total PCB residues of 0.004, 0.007, and 0.6 mg/Kg, respectively (Figure 11).

Artificially-Fertilized Egg Masses

Results from the artificial fertilization studies are presented in Figure 12. Because of the poor reproductive fitness of the target site frogs, particularly the female specimens, few artificial fertilization studies were completed successfully with specimen from the target site sampling locations. Of the target site sampling locations, only one set of eggs from site W-4 (0.5 mg/Kg sediment total PCBs) was successfully fertilized. Artificial fertilization attempts with stage V and VI oocytes were made with oocytes from sites W-1, EW-3, and W-1 (0.2, 30.0, and 18.0 mg/Kg sediment total PCBs, respectively). However, none of these attempts resulted in

fertilized embryos. Since the oocytes from females collected from the other sites were grossly immature (< stage III), artificial fertilization of egg masses was not performed. Greater than 50% of the oocytes from target site W-4 were successfully fertilized following artificial fertilization. Although nearly 90% of the fertilized egg mass was viable following fertilization, none of the developing embryos successfully hatched. A high degree of exogastrulation (ca. 75%) was noted in embryos from this clutch. In contrast, a fertilization rate of nearly 67% was achieved in the first trial using R1 external reference specimens. Approximately 97% of the fertilized embryos were normal appearing immediately following fertilization, although only 47% successfully hatched. In the second trial using oocytes from R3 external reference specimens, a fertilization rate of almost 98% was achieved with 100% appearing normal immediately following fertilization. Approximately 66% of the artificially fertilized R3 external reference embryos from trial 2 hatched. R2 external reference specimens were used only on a limited basis for artificial fertilization studies.

Developmental Evaluation of Field Collected Egg Masses or Larvae

Sample exposure scenarios for the culturing phase of the present study are provided in Appendix D. Because of the limited success obtaining artificially fertilized embryos from the target site sampling locations, attempts were made to collect egg masses, and in some cases hatchlings from each of the sampling locations. Although few *R. pipiens* egg masses were found at the target site sampling locations, egg masses were collected at the following sites: W-7a, W-4, and W-1 (18.0, 0.5, and 0.2 mg/Kg sediment total PCBs, respectively). As previously mentioned, hatchlings were collected at sites W-6 and EW-3 (42.0 and 30.0 mg/Kg sediment total PCBs, respectively). As previously indicated, the actual age difference between the egg masses and larvae collected and field exposure was negligible. Embryos from the artificially fertilized R3 reference egg masses were also cultured in reference site MP (0.04 mg/Kg sediment total PCBs) water and sediment. Due to the low number of specimens completing metamorphosis from the target sites relative to the external reference specimens, the developmental study was terminated prior to each specimen completing metamorphosis. The study period length utilized was sufficient for the majority of normally maturing larvae to complete metamorphosis. Since specimens from each treatment were allowed to progress towards metamorphosis, metamorphic completion and

mortality endpoints required longer exposure duration. Larval growth data was, however, collected over a shorter exposure period. Because larval growth as measured by linear length during the latter stages of prometamorphosis and metamorphic climax is not a suitable measure of development due to metamorphic changes, such as resorption of the tail, growth data was truncated prior to metamorphosis.

Rates of embryo/larval mortality of specimens cultured from the field collected egg masses or early hatchlings and artificially fertilized (external reference specimens only) egg masses are presented in Figure 13. Developmental phase inventory lists and data tables are provided as Appendix E. The mean larval mortality rates for embryos cultured from each of the target sites were substantial greater than observed in the external reference embryos. The mean mortality rate at the conclusion of larval culture for the reference site MP (0.04 mg/Kg sediment total PCBs) was 43.8%, whereas, the morality rates for each of the target sites ranged from 87.7% (W-4, [0.5 mg/Kg sediment total PCBs]) to 100.0% (EW-3, [30.0 mg/Kg sediment total PCBs]) (Figure 14).

Developmental kinetic results for egg masses cultured in the laboratory from each site are provided in Figure 15. Evaluation of developmental kinetics, or rate of development, provided an assessment of the specific rates of development by assessing the stage of development relative to the time in culture. The rate of development of larvae cultured from sites W-7a, W-6, and EW-3 (18.0, 42.0, and 30.0 mg/Kg sediment total PCBs, respectively showed slower development compared to the R3 larvae cultured in reference site MP (0.04 mg/Kg sediment total PCBs) water and sediment. A slightly lesser degree of slowed development was also noted in larvae cultured from egg masses collected from sites W-4 and W-1 (0.5 and 0.2 mg/Kg sediment total PCBs, respectively) compared to the R3 larvae cultured in reference site MP (0.04 mg/Kg sediment total PCBs) water and sediment. Generally, larvae cultured from sampling sites with greater sediment PCB and other COPC levels developed more slowly than larvae from lesser-contaminated, or uncontaminated sampling locations.

The incidence of mean malformation observed in larvae cultured from target sites W-7a, W-6, and EW-3 (18.0 mg/Kg, 42.0 mg/Kg, and 30.0 mg/Kg sediment total PCBs, respectively) were

11.8%, 14.2%, and 37.5%, respectively, during the entire culture period. The frequency of malformation in R3 specimens cultured in reference site MP media (0.04 mg/Kg sediment total PCBs) during each of the evaluation periods were 0.0% at days 0, 7, and 20, and 1.3% at day 42, 16.9% at day 48, and 2.5% at day 76, with the mean malformation of 3.4%. The frequencies of malformation in larvae from site W-1 (0.2 mg/Kg sediment total PCBs) were < 2.0% during all evaluation periods with the exception of the fourth evaluation period (day 31), which was 10.2%. The mean malformation for the duration of the exposure period for site W-1 was 1.9%. The frequencies of malformation in larvae from site W-4 at each respective evaluation period were < 3.0%, with the mean malformation of 0.7%.

Overall, the incidence mean malformation for specimens cultured from sites W-7a, W-6, and EW-3 (18.0, 42.0, and 30.0 mg/Kg sediment total PCBs, respectively) recorded during the entire culture period were generally greater than the mean malformation rate measured for the reference site specimens (Figure 16). With the exception of reference site MP, all sites exhibited larval malformations on study day 0, with sites W-7a, W-6, and EW-3 (18.0, 42.0, and 30.0 mg/Kg sediment total PCBs, respectively) ranging from 15.7% to 30% malformation. Sites W-4 and W-1 (0.46 mg/Kg and 0.15 mg/Kg sediment total PCBs) had minimal malformations (2.8% and 1.8%, respectively) on study day 0. Having malformations at the start of the study was not necessarily unusual, considering that the study specimens had been cultured in their original natal media at least six days prior to the study start day 0. This six day period accounted for field collection of the egg masses and development to ca. stage 20.

During the course of development, many malformed organisms died. Other malformations were resorbed during the process of metamorphosis, which is initiated at Gosner stage 30 and concludes at Gosner stage 46 when the larvae completely transforms into a metamorph. During metamorphosis, a complete remodeling of the larval body occurs to provide anatomical and physiological transition toward the terrestrial life phase. During metamorphosis, tadpole-specific organs are resorbed, including the tail, mouth parts, and gills; *de novo* synthesis of adult organs occurs, including the limbs; and remodeling of many systems, including the liver, nervous system, intestine, and skin (Shi, 2000). Since many of the organ systems are conserved between the tadpole and adult frog in a remodeled format, the latter is the most important. It is the

process of remodeling that causes external malformations to transitory in some cases. This was not an isolated incident, as this has been observed in other similar situations (Fort and McLaughlin, 2003). Some of the malformations are incorporated into the remodeling process in the form of internal abnormalities observed in the metamorph specimens examined.

In the present study, the mean malformation frequency was calculated based on the average incidence of malformation at each observation event. Thus, this metric represents an average proportion malformed throughout the duration of the test. Importantly, the calculation of each malformation frequency reported was based on the initial number of live specimens at the beginning of the developmental study (day 0).

The proportion of each type of malformation observed in larvae raised in the laboratory from each site is presented in Figures 17-22. Malformations of the tail, fin, craniofacial region, eye, mouth, and, to a lesser extent, notochord and abdominal edema were noted as characteristic abnormalities in lab-reared larvae from sites W-7a, W-6, and EW-3 (18.0, 42.0, and 30.0 mg/Kg sediment total PCBs, respectively). Illustration of these malformations is provided in the project photo atlas included as Appendix F. More specifically, axial flexure of the tail resulted from abnormal myotome development. Notochord lesions in the anterior portion of the tail resulted in an osteolathyrogenic-like kinking of the tail. Visceral hemorrhage was noted in several of the specimens from each of these sites. Morphological distortion of the craniofacial and mouth region and incomplete development of the lens of the eye were also observed. Although some malformations were detected in reference site larvae, most were sporadically distributed. No true characteristic abnormalities, beyond baseline effects, were noted in malformed larvae from sites W-4 and W-1 (0.5 and 0.2 mg/Kg sediment total PCBs, respectively), and the external reference R3 specimens in site MP (0.04 mg/Kg sediment total PCBs) water and sediment.

Embryo-larval growth rates for larvae cultured from each of the target and reference sites are presented in Figure 23. The rate of larval growth in specimens cultured from each of sites W-7a, W-6, EW-3, and W-4 (18.0, 42.0, 30.0, and 0.5 mg/Kg sediment total PCBs, respectively) was less than the growth rate measured for the reference site specimens during the first 50 d of development. Reasonably consistent increases in larval growth were noted in specimens

cultured in site W-1 (0.2 mg/Kg sediment total PCBs) during the first 50 d. The rate of larval growth at \geq 60 d of culturing was less than the growth rate measured in the reference specimens in specimens from sites W-7a and W-1 (18.0 and 0.2 mg/Kg sediment total PCBs, respectively). Generally no difference in growth rates relative to the reference specimens were detected in specimens from W-4 and W-6 (0.5 and 42.0 mg/Kg sediment total PCBs, respectively).

Larval Maturation and Metamorphosis

The ability of larvae cultured in the laboratory from each site represented in this study to successfully complete metamorphosis is presented in Figure 24. The mean proportion of metamorphosing larvae from the reference specimens cultured in laboratory water was approximately 62.5%. However only 5.6% of the reference specimens cultured in reference site MP water and sediment metamorphosed. The incidence of metamorphosis ranged from 0% to 3.0% in specimens cultured from the other sites. However, due to high rates of mortality during larval development, interpretation of these results is difficult. These results do not necessarily imply that larvae from the various cultures were incapable of completing metamorphosis, but simply that they had not at the completion of the study.

Crossover Exposure Studies

The impact of exposing reference specimens (R3) to site water and sediments from each of sites MP (0.04 mg/Kg sediment total PCBs) and W-8 (120 mg/Kg sediment total PCBs) on larval mortality is presented in Figure 25. No formal statistical analysis with the R1 treatment group was performed. The frequency of mortality at culture d 106 for R3 external reference specimens cultured in site W-8 (120 mg/Kg sediment total PCBs) media (Figure 25) was not significantly different than observed in R3 reference larvae cultured in reference site MP media (t-test, 1 tail, 0.05).

The impact of exposing reference specimens (R3) to water and sediments from each of sites MP (0.04 mg/Kg sediment total PCBs) and W-8 (120 mg/Kg sediment total PCBs) on larval

malformation is presented in Figure 26. The frequency of malformation in R3 larvae cultured in site W-8 media following 76 d of exposure was significantly greater than R3 larvae cultured in reference site MP media (t-test, 1 tail, 0.05). The mean frequencies of malformation recorded in R3 larvae cultured in site MP water and sediment was ca. 3.4%. The mean incidence of malformation in R1 and R3 larvae cultured in site W-8 water and sediment was approximately 19.1% and 19.8%, respectively. As previously mentioned, total PCB levels in R3 larval specimens cultured in target site W-8 sediment and water were appreciably greater than levels measured in R3 specimens cultured in reference site sediment and water (site MP). The primary characteristic malformations observed in either R1 or R3 specimens cultured in site W-8 (site 33) water and sediment were abdominal edema, abnormal developmental of the tail, notochord, face, eye, and mouth (Figures 27-29). Some visceral hemorrhage was also noted. Sporadic, random malformations were detected in the reference larvae (R1 and R3) cultured in reference site water and sediment (site MP). Although some were generally similar to malformations found in the cross over culture specimens, none were characteristic and a specific syndrome similar to the cross over culture specimens was not identified.

The impact of exposing reference site specimen (R3) to site water and sediments from each of sites MP (0.04 mg/Kg sediment total PCBs) and site W-8 (120 mg/Kg sediment total PCBs) on larval growth and developmental kinetics is presented in Figures 30 and 31. The rate of growth, as measured by linear length, was slightly slower in R3 specimens cultured in site W-8 media compared R3 specimens cultured in reference site MP sediment and water (t-test, 1 tail, 0.05). The overall rate of development, as measured by stage obtained relative to days in culture, was appreciably slower in the R3, and, more dramatically, in the R1 larvae cultured in site W-8 media than R3 specimen cultured in MP reference media.

The ability of larvae cultured in the laboratory, from each site represented in this study, to successfully complete metamorphosis is presented in Figure 32. The proportion of larvae completing metamorphosis relative to the initial number of specimens in culture in R3 specimen cultured in reference site MP media was not significantly different than the site W-8 crossover treatment (t-test, 1 tail, 0.05). The incidence of metamorphosis ranged from 5.3% in R1 to 8.8% in R3 specimens cultured in site W-8 (120 mg/Kg sediment total PCBs) media.

Aroclor 1260-Spiked Sediment

The effect of exposing reference specimens (R4) to water and sediments from site MP (site 40) spiked with 30.0 mg/Kg Aroclor 1260 on larval mortality is presented in Figure 33. Mortality rates (reference treatment 26.3% and 28.8% for the Aroclor 1260-spiked treatment) for either treatment scenario were not significantly different from each other (Wilcoxon Two-Sample Test, 1 tail, 0.05 and KW-ANOVA, P=0.05).

The impact of exposing reference specimen (R4) to site water and sediments from site MP (site 40) spiked with 30.0 mg/Kg Aroclor 1260 on larval malformation is presented in Figure 34. Final mean incidence of malformation recorded in R4 larvae cultured in site MP water and sediment spiked with 30.0 mg/Kg Aroclor 1260 was greater than the frequency of malformation measured in the R4 larvae cultured in site MP water and sediment (Wilcoxon Two-Sample Test, 1 tail, 0.05 and KW-ANOVA, P=0.05). The overall frequency of malformation recorded in R4 larvae cultured in site MP (site 40) water and sediment was 0%. The overall incidence of malformation in R4 larvae cultured in site MP (site 40) water and spiked sediment was 24.3%. Total PCB levels in R4 larval specimens cultured in reference sediment and water spiked with 30.0 mg/Kg Aroclor 1260 were greater than levels measured in R4 specimens cultured in reference site sediment and water (site MP). Characteristic malformations identified in larvae exposed to Aroclor 1260-spiked reference sediment site MP included abnormal development of the tail, craniofacial region, mouth, and eye (Figure 35). Visceral hemorrhage and blisters of the dorsal fin were also noted. The only malformation observed in the Aroclor 1260 spiking study not observed in the cultured target site larvae was abnormal brain development characterized as microcephaly. Specimens cultured in Aroclor 1260-spiked reference site sediment also demonstrated delayed development compared to reference organisms. In fact, a strong relationship between the sediment total PCB levels and developmental delay was observed in each of the primary study, crossover exposure study, and Aroclor 1260 spiked sediment study.

QUALITY ASSURANCE

Data Quality Objectives

The primary objective of this study was to assess the impact of PCB exposure on reproduction, development, and maturation in *R. pipiens* collected from respective sampling locations throughout the study area. Overall, this study provided a suitable attempt to determine the effect of PCB exposure to reproductively mature and early life stage *R. pipiens* on reproductive capacity and developmental fitness, based on the data collected from this study. The following data was collected in accordance with the specific quality assurance criteria established for this project, using the approach and methods established in the protocols established for this study, including whole body weight, ovary and testes weight, the number of egg mass oocytes per ovary, oocyte stage distribution, oocyte necrosis, artificial fertilization, early embryogenesis, metamorphosis, water and sediment contaminant analysis, and tissue residue analysis. Data verification using the approach described in the preceding sections was used to verify the results.

Data Quality Indicators

Data developed in the "*Rana pipiens* Reproduction and Development Study" met acceptable standards of precision, accuracy, completeness, representativeness, comparability, and sensitivity, as defined in Section 15 of the QAPP (Weston, 1999). No adult specimens were collected from the designated reference locations within the study area. Therefore, adult specimens collected from an external sampling location outside the study area were used as reference specimens. Six female specimens were collected from each sampling location with the exception of site E-1 and site W-4. Six male specimens were collected from each sampling location with the exception of site W-7a and site W-4. Sufficient female specimens were collected from each site, with the exception of site E-5, for whole body composite tissue analysis. Due to the poor reproductive condition of female specimens collected from each of the target site sampling locations, only one set of artificially fertilized oocytes was collected during the present study (site W-4). External reference specimens produced a sufficient quantity of

artificially fertilized embryos to conduct the proposed studies. Field egg masses or larvae were collected from sites W-7a, W-4, and W-1; and W-6 and EW-3 (18.0, 0.5, and 0.2; and 42.0 and 30.0, respectively, mg/Kg sediment total PCBs), respectively. No egg masses were found at the remaining target sampling locations.

DISCUSSION

REPRODUCTIVE EVALUATION

Results from the present study demonstrated that adult R. pipiens specimens collected from the various sampling locations throughout the study area showed marked signs of reproductive stress. Although both female and male specimens demonstrated signs of significant reproductive stress, the effects found in adult female specimens were more dramatic than observed in the male specimens, from a biological standpoint. Female specimens collected from each of the target site sampling locations were incapable of reproducing by artificial means in the laboratory, based on this evaluation. Only one artificial fertilization attempt was successful with the target site specimens. The successful trial occurred with one set of specimens collected from site W-4. However, development of this set of artificially fertilized embryos was extremely poor. On the contrary, little difficulty was encountered in artificially fertilizing external reference specimens (R1-R3). Further, early development and hatching success was reasonably high. Overall, it is unlikely that the female specimens collected from the target site sampling locations would have been capable of reproducing successfully in the field, under natural conditions. Although the external reference adult specimens were likely not exposed to the same environmental stressors as the adult specimens collected from target sites within the lower Housatonic River watershed, the magnitude of the adverse effects observed in the target specimens substantially reduces its importance.

As previously indicated, gravidity is a subjective assessment of reproductive status in the female, as marked by the presence of mature eggs. Thus, the presence of developing eggs in the ovary alone does not necessarily confer gravidity. Externally, gravidity was determined by assessing the degree of distension of the ovaries and determined by gently squeezing the flanks of the female. Thus, this measure of reproductive status was subjective and was confirmed by a specific examination of the ovaries and oocytes. Only external reference female specimens were found to be fully gravid. Several female frogs collected from sites W-7a, W-6, W-4, EW-3, and W-1 (18.0, 42.0, 0.5, 30.0, and 0.2 mg/Kg sediment total PCBs, respectively) were found to be

"slightly gravid". In this case, a slight distension in the ovaries was noted. Specific examination of the ovaries or egg masses determined that the "slightly gravid" specimens were not reproductively fit. None of the females collected from E-5, W-9a, W-8, and E-1 (37.0, 4.3, 120.0, and 160.0 mg/Kg sediment total PCBs, respectively) were found to be gravid.

The timing of collection of adult *R. pipiens* from the target sites coincided with the normal onset of reproductive receptiveness and initiation of breeding activity. Adult specimens were collected between March 25, 2000 and April 22, 2000. Surface water temperatures in the study area were approximately 8 to 10° C at the time of collection. These temperatures represented the ideal environmental "triggers" for the frogs to emerge in the early spring and gather in breeding areas. Typically, males begin chorusing when water temperatures reach approximately 8° C, with oviposition peaking when water temperatures reach 10° C (Gilbert et al, 1994). Hine et al (1981) reported the occurrence of breeding when water temperatures reached or slightly exceeded 10° C in Wisconsin ponds.

With few exceptions, each of the reproductive status metrics evaluated indicated that the female specimens from the various target site sampling locations were reproductively impaired. Whole body and ovary weights (expressed as % of the whole body weight) were generally less in female specimens collected from each of the target sites than in the external reference female specimens. The most intriguing finding, however, was the marked immaturity of the oocytes in females collected from each of the target site sampling locations. Although some relatively insignificant gross pathology was noted in some of the ovaries examined from the target site specimens, the primary finding was that the oocytes were not mature. Considering that only mature oocytes can be fertilized, this finding was quite substantial. Conventional oocyte staging in amphibians ranged from stage I (immature) to stage VI (mature) (Dumont, 1972). In order for fertilization to occur, oocytes must be at stage VI. The process of oocyte maturation occurs cyclically over the course of the female's reproductive years and begins with oogenesis early in development. As the oocyte develops, it grows in mass. Stages I and II oocytes are previtellogenic. During these stages, the lampbrush chromosomes begin to organize and prepare for condensation during the middle stage of oogenesis. During these early stages, lipid droplets form. Early vitellogenin

incorporation into the oocyte occurs during stage III and continues throughout stage IV. During the process of vitellogenesis, large, dense yolk platelets emerge and the separation in animal and vegetal poles (yolk) becomes more apparent in stages IV and V. Final maturation of the stage VI oocyte occurs at the onset of breeding and is stimulated by a series of complicated biochemical events in the reproductively mature female and the oocyte.

In this study, we found that the number of oocytes per g ovary tissue was reasonably similar in the specimens evaluated from each of the target and the external reference specimens. Thus, we could not determine the reproductive status of the ovary based on the gross number of developing eggs per g ovary weight. This was not necessarily surprising, considering that the gross change in weight of an oocyte for each stage obtained was difficult to measure using conventional technologies, and the natural variability in stage distribution made it difficult to quantify these differences statistically. Thus, evaluation of oocyte stage distributions in the ovary was important in this study. Immature oocytes were observed in female specimens collected from the remaining target site sampling locations. Developing oocytes were found in specimens from sites W-7a, W-4, EW-3, and W-1 (18.0, 0.5, 30.0, and 0.2 mg/Kg sediment total PCBs, respectively). However, none of the sites produced female specimens that possessed any biologically significant quantity of stage V or VI oocytes, with the exception of the external reference specimens. Therefore, the lack of success in artificially fertilizing oocytes from target site specimen was not surprising and appeared to be the primary biologically limiting step in the reproductive stress observed in the target site specimens evaluated in the present study. The length of period used to hold the adult R. pipiens prior to evaluation was not excessive and was consistent with the handling practices cited by Edgington et al. (2002), Parris (1999), Parris et al. (1999), Parris et al. (2001), and Porter and Licht (1985). Further, the holding time did not influence the outcome of our evaluation. The health of the specimens was monitored throughout the brief holding period and found not to be a factor.

It is unlikely that holding the frogs for a somewhat longer period of time would have improved the success of artificial fertilization or increased the distribution of mature oocytes. The process of oocyte maturation occurs immediately after oviposition, which had not occurred in the specimens examined. Maturation from an oogonia (oocyte) to either an ova (egg) or a follicular

cell occurs during the remainder of year prior to hibernation. During the spring breeding season, the oocyte matures, and when environmental conditions are favorable, oviposition occurs. Thus, holding them an additional month or so would not have had a large impact on the distribution of the oocytes. In addition, no signs that oviposition already occurred or that the female simply did not release her eggs during the previous year, as there was no evidence of cytolysis, as determined from ovary slides made from ovaries with immature oocytes.

Whole body total PCB levels in females collected and composited from the various sampling locations were reasonably consistent within the more highly contaminated sites (based on sediment total PCB levels) ranging from 1.8 mg/Kg (site W-6 [42.0 mg/Kg sediment total PCBs]) to 5.4 mg/Kg (site W-8 [120.0 mg/Kg sediment total PCBs]). Lesser whole body total PCB residues (0.3 and 0.2 mg/Kg at sites W-4 and W-1 [0.5 and 0.2 mg/Kg sediment total PCBs, respectively]) were found in specimens captured from the lesser-contaminated target sites. Total PCB levels found in whole body composites of the external reference specimens were appreciably less than that found in the specimens from the lesser total PCB contaminated sites. Thus, a reasonably strong relationship between whole body tissue levels and sediment total PCB levels from the various sampling locations existed which was not necessarily expected in the adults. The accumulation of total PCBs in the ovaries of females from the various target sites was highly variable. The variability in ovary total PCB levels ranged from 1.2-fold in specimens from the lesser contaminated site W-1 (0.2 mg/Kg sediment total PCBs) to 79.8-fold in specimens collected from the more highly COPC-contaminated site W-9a (4.3 mg/Kg sediment total PCBs). Little variation in ovary total PCB levels was found in the external reference specimens. Some variability was noted in offal total PCB residues from individual females collected from the target sites, but not nearly to the extent observed in the ovary tissue. In several of the specimens from which ovary samples were collected and analyzed for total PCB residues, extensive accumulation was found relative to the offal levels. Ovary total PCB accumulation is not necessarily surprising given the high lipid content of the oocytes within the ovaries. In contrast, several specimens showed slightly greater or similar levels of total PCBs in the offal samples compared to the ovary samples. Overall, these results indicated that the ovary was vulnerable to high levels of PCB accumulation. Results from the present study also suggested that accumulation profiles were likely affected by many different factors relating to

differences in environmental conditions, exposure scenarios, and biological differences in the specimens evaluated in the present study.

Since ovary total PCB levels were monitored in randomly selected individual specimens from each site, the toxicological effects observed in these specimens can be directly traced to the tissue burdens. The greatest levels of total PCB accumulation in the ovary were observed in specimens F003, F006, F003, and F009, collected from sites W-9a, W-7a, W-6, and EW-3 (4.3, 18.0, 42.0, and 30.0 mg/Kg sediment total PCBs, respectively). The specimens demonstrating the least total PCB accumulation was found in specimens F006, F005, F005, and F008 collected from sites W-9a, W7a, EW-3, and W-1, respectively (4.3, 18.0, 30.0, and 0.2 mg/Kg sediment total PCBs, respectively). Interestingly, the least amount of accumulation in the ovary was found in the specimens with the least mature oocytes. In specimens containing the greater levels of ovary total tissue PCBs, the oocytes were more advanced in developmental stage, although the majority was no greater than stage III. Since the more advanced oocytes contained a substantially greater concentration of yolk, which is primarily composed of lipids and lipoproteins, mid- to advanced stage oocytes would be more likely to accumulate hydrophobic contaminants, such as the COPCs considered in this study. However, even though more advanced oocytes were found in specimens containing substantially greater levels of ovary total PCBs, only a few stage VI oocytes were found, indicating that the final stage of maturation that involved hormonal induction of the final preparatory event known as germinal vesicle breakdown (GVBD) may have been inhibited. Further, since oogenesis and, to a greater extent, maturation, were inhibited in ovaries with tissue residues of as low as 0.3 mg/Kg. It was possible that the COPCs, considered in this study, did not disrupt the process of oogenesis as substantially as oocyte maturation events. Although it was likely that accumulation of PCB and other COPCs in the ovary tissue did not completely determine reproductive status in the adult female frog, offal levels in these specimen were relatively low, suggesting that either other sites of action were appreciably more sensitive to PCB and PCB-like COPC toxicosis, or that effects at the oocyte level were the primary driving factors in the reproductive dysfunction observed in this study. At this point, not enough information is available to completely resolve this question. However, new evidence presented in the "Comparison with Other Studies" section indicated that the effect of PCB and PCB-like COPCs on ovary status may lie at the oocyte level.

In the evaluation of data from the present study, the data correlations were based on the following criteria: 1) exclusion of juveniles from tissue residue and reproductive endpoints, 2) exclusion of reference animals for correlations with sediment PCBs and reproductive endpoints, 3) inclusion of all adult frogs, 4) inclusion of both gravid and non-gravid sexually mature females, and 5) segregation of tissue samples from reference animals in the correlation calculations (n=7) in Table 3. From this evaluation, only one relationship was found to be significant statistically, ovary tissue concentration and proportion of stage VI (mature) oocytes (Spearman's Rank Correlation, 2-tail test, p=0.05, n=7, and r=-0.86). Qualitative relationships were also found between whole body (offal) weight and either whole body (offal) tissue or ovary total PCBs; ovary weight and either whole body (offal) tissue or ovary total PCBs; and oocyte necrosis and ovary tissue total PCBs.

From this analysis, it is important to understand several critical points. First, the lack of significant statistical correlation should not be interpreted as an insignificant response. The plots corresponding to the correlation analysis are provided in Appendix D. These plots, in addition to the graphical representation of the data, demonstrated the substantial amount of variability associated for many of the endpoints at the lower sediment total PCB concentrations. In addition, data from only two high sediment total PCB sites were available, limiting the ability to evaluate relationships between total PCB levels and the biological endpoints, ultimately creating a higher degree of uncertainty. It is important to note that the collection of insufficient samples at the more highly PCB contaminated sites was not the result of inadequate sampling efforts, but potentially the impact from contamination. In several cases, a relatively flat concentration-response curve at a high magnitude of effect was observed such that a marked response was observed in all PCB concentrations tested. In these cases, Spearman's correlation analysis was not effective in translating the significance of the effects observed.

The second point is the importance of considering the biological significance of effects observed independent of statistical outcome. The biological significance of the results from the present study is discussed throughout the remainder of this report. In summary, the marked immaturity of eggs (including the lack of banded, stage VI oocytes), reduction in ovary weight, substantial

total PCB accumulation in the ovary, and the lack of significant numbers of egg masses found at contaminated natal sites suggested that female *R. pipiens* evaluated in this study were under reproductive stress. Although less conclusive, decreased sperm cell counts and increased sperm cell dysmorphology also suggested that male *R. pipiens* may also have been reproductively stressed.

Finally, the capacity of Aroclor 1260 to interfere with oocyte maturation (GVBD) provided a potential mechanistic link between exposure and the effects observed. More work will be required to fully establish the connection between PCB exposure, PCB accumulation, *in vivo* and *in vitro* effects on oocyte maturation, and ultimately, reproductive stress. However, as it currently stands, this relationship strengthens the biological relevance of the data collected.

Reproductive stress was also measured in the male specimens collected from the various target sites during this study. Since tissue total PCB data was only obtained in female specimens, due to the greater severity of toxicological response, comparisons of toxicological responses to tissue levels was not possible. Generally, reduced testis weight, reduced sperm count, and increased rates of sperm cell dysmorphogenesis were found in specimens collected from sites W-8, W-7a, and W-4 (120.0, 18.0, and 0.5 mg/Kg sediment total PCBs, respectively); W-8 and EW-3 (120.0 and 30.0 mg/Kg sediment total PCBs, respectively); and each target site, but site W-4 (0.5 mg/Kg sediment total PCBs), respectively. Thus, the rate of sperm cell dysmorphogenesis appeared to be the most sensitive reproductive endpoint measured in the male specimens collected. Reduction in sperm counts appeared to be the least sensitive, in part, due to natural variability. Further, the strongest relationship between sediment total PCB levels and toxicological effect was sperm dysmorphology. Some relationship was established between reduction in testis weight and sediment total PCB levels.

DEVELOPMENTAL EVALUATION

Due to the poor reproductive condition of the target site specimens, extremely limited quantities of artificially fertilized embryos were available to conduct the developmental phase of the

present study. Thus, egg masses and larvae from several of the sites were collected to evaluate development. As with the artificial fertilization component, limited numbers of *R. pipiens* egg masses were found in the field at the selected sites. This did not appear to be related to habitat issues, as habitat surveys prior to the study indicated that each site selected was suitable *R. pipiens* habitat. The lack of field eggs also did not appear to be due to the period in which collection was attempted, as surveys for *R. pipiens* egg masses were performed throughout the study. Reduction in *R. pipiens* egg masses may not have been a transient finding either, as similar findings were noted during the previous year. However, further local population analysis will be required to determine if this trend continues and the extent to which it translates to the local population level.

Although few *R. pipiens* eggs masses or larvae were found at the target site sampling locations, egg masses were collected at the following sites: W-7a, W-4, and W-1; or W-6 and EW-3, respectively. Embryos from the artificially fertilized external reference egg masses (R3) were also cultured in reference site MP water and sediment. Mortality rates measured in cultured egg masses from each of the target sites above were appreciably greater than the incidence of mortality measured in the external reference culture (R3 specimens in site MP water and sediment). The rate of development of larvae cultured from sites W-7a, W-6, and EW-3 (18.0, 42.0, and 30.0 mg/Kg sediment total PCBs, respectively) showed slowed development compared to the reference larvae (R3) cultured from reference site MP.

Overall, the incidence of malformation for specimens cultured from sites W-7a, W-6, and EW-3 (18.0, 42.0, and 30.0 mg/Kg sediment total PCBs, respectively) recorded during the entire culture period were generally greater than the frequency of malformation measured for the reference site specimens. Results from the present study suggested that larval mortality and malformation were influenced by both the maternal transfer of PCBs and environmental exposure to these contaminants (and accumulation) during development. Slower development was also observed more substantially in target site specimen from sites with the greatest levels of sediment total PCB contamination. Duration of exposure to these contaminants may have been a greater factor than the actual environmental concentration the organism was exposed to, unless the contaminants were supplied to the developing organism via a transgenerational route. It

should also be noted that only total PCBs were analyzed in the developing larvae, thus other COPCs, including PCB-like COPCs, were not considered in this evaluation.

Abnormal development of the tail, notochord, craniofacial region, eye, and mouth were noted as characteristic malformations in lab-reared larvae from sites W-7a, W-6, and EW-3 (18.0, 42.0, and 30.0 mg/Kg sediment total PCBs, respectively). More specifically, axial flexure of the tail resulted from abnormal myotome development. Notochord lesions in the anterior portion of the tail resulted in an "osteolathyrogenic-like" kinking of the tail. Visceral hemorrhage was noted in several of the specimens from each of these sites. Morphological distortion of the craniofacial and mouth region, and incomplete development of the lens of the eye were also observed. No characteristic abnormalities beyond baseline effects were noted in malformed larvae from sites W-4 and W-1 (0.5 and 0.2 mg/Kg sediment total PCBs, respectively), and the external reference site MP (0.04 mg/Kg sediment total PCBs). These malformations were similar in nature to those observed in other frog species, including other ranids and the South African clawed frog (*Xenopus laevis*). Thus, the syndrome produced appeared to be characteristic of exposure to these PCB or PCB-like contaminants.

The rate of larval growth in specimens cultured from each of sites W-7a, W-6, EW-3, and W-1 (18.0, 42.0, 30.0, and 0.2 mg/Kg sediment total PCBs, respectively) was generally less than the growth rate measured for the reference site specimens during the first 40 d of development. This reduction in growth rate appeared to coincide with the general trend of developmental delay found in specimens from most of the target sites, with the exception of sites W-4 and W-1 (site0.5 and 0.2 mg/Kg sediment total PCBs, respectively) that had lower total PCB sediment levels. Reasonably consistent increases in larval growth were noted in specimens cultured from site W-1 between 40-80 d. Greater increases in growth between 40-80 d were noted in specimens from sites W-4 and W-6 (0.5 and 42.0 mg/Kg sediment total PCBs, respectively). The proportion of specimens completing metamorphosis for the target site sampling locations was generally less than the proportion of reference site specimens completing metamorphosis. This trend may have been skewed, somewhat, by the high incidence of mortality observed in the field egg masses from several of the target sites cultured in the laboratory.

CROSSOVER AND AROCLOR 1260-SEDIMENT SPIKING STUDIES

Due the limited number of fertilized embryos available to perform the crossover experiments, only exposure of R3 external reference specimens to site water and sediments from each of sites MP (0.04 mg/Kg sediment total PCBs) and W-8 (120 mg/Kg sediment total PCBs) and R4 external reference larvae to site W-8 were performed. The mortality rate for R3 specimens cultured in site W-8 media was similar to that observed in R3 reference larvae cultured in reference site MP media. In addition, mortality rates were similar for the treatment scenario exposing R4 external reference larvae to both reference site MP water and unspiked sediment and reference site MP spiked with 30 mg/Kg Aroclor 1260. These results provided additional evidence that transpenerational PCB transfer may have been responsible for early embryo-larval lethality, since low levels of PCBs would have been maternally transferred to the developing embryo. Overall, the malformation rates recorded in R3 larvae cultured in site W-8 media, and R4 larvae cultured in Aroclor 1260 spiked reference sediment and water (site MP) were generally greater than the malformation rates measured in R3 and R4 larvae cultured in reference site MP media (without the Aroclor 1260 spike), respectively.

As previously mentioned, total PCB levels in the external reference larval specimens cultured in target site W-8 (120.0 mg/Kg sediment total PCBs) water and sediment were greater than levels measured in external reference larvae cultured in reference site MP water and sediment, indicating that the larvae were accumulating total PCBs during the laboratory culture. Further, total PCB levels in R4 external reference larval specimens cultured in reference site MP water and sediment spiked with 30.0 mg/Kg Aroclor 1260 were greater than levels measured in R4 external reference specimens cultured in reference site water and sediment (site MP without the addition of Aroclor 1260. These results also corroborated the findings of the general egg mass culture studies that suggested that environmental exposure to total PCBs during development appeared to have had a greater bearing on developmental toxicity than maternal transfer of these toxicants via the oocyte. Clearly, both exposure routes affected developmental fecundity in the present study.

The rate of growth was slightly slower in R3 specimens cultured in site W-8 (120.0 mg/Kg sediment total PCBs) media compared to R3 specimens cultured in reference site MP sediment and water. The overall rate of development, as measured by stage obtained relative to days in culture, was appreciably slower in either the R3 or, more dramatically, the R1 larvae cultured in site W-8 water and sediment than R3 specimens cultured in site MP media. This developmental delay was also detected in the egg mass culture studies from the various target sites. Slowing the rate of development could of had a profound impact on the induction of abnormal development, as it increased the length of critical developmental windows, which in turn, increased exposure potential. Overall, this effectively increased the probability of a developmental anomaly occurring.

OTHER COPCS

Metals concentrations were above the lower sediment quality value at all sampling areas, including the MP reference site. The distribution of metals concentrations was fairly similar across locations in the study area, with the exception of site E-1, which had the highest metals concentrations. Upper sediment quality values were exceeded for chromium, copper, lead, mercury, nickel, silver, and zinc. Concentrations of some metal COPCs (chromium, mercury, nickel) were lower at the reference site compared to the study target sites, but the magnitude of the difference was not large, and there are a small number of reference area samples. These differences may be explained by the differences in substrate (predominantly coarse-grained material and lower total organic carbon (TOC) content in the reference sample). Overall, the levels of metal COPCs were similar between the study area and reference locations, with the exception of leopard frog sampling area E-1.

Organic carbon (OC)-normalized PAH concentrations were above sediment quality values at most sites in the study area. Three sites (E-5, W-9a, W-4) exhibited the highest PAH concentrations. With the exception of naphthalene, all PAH concentrations at the reference vernal pools were either low or below detection limits. Even with OC-normalization (reference

location sediments had low TOC), the PAH concentrations were lower at the reference location relative to several sites in the study area.

2,3,7,8-TCDD toxic equivalence (TEQ) were calculated using the Van den Berg et al. (1998) TEFs for fish as a means to compare sites. These were considered the best available surrogate for the amphibians. TEQ concentrations were generally low and exceeded 0.10 μ g/kg TEQ only at Site E-1, which was also the location with the highest sediment total PCB concentration (160 mg/Kg).

Because of the uncertainty in relating water chemistry to effects on amphibians, the most relevant data are those collected in conjunction with effects measurements. These data were collected in conjunction with sediment sampling conducted for the amphibian developmental study (10 water samples). For the most part, all other COPCs measured in the water samples were not retained as COPCs. Dioxins and furans were measured in all of the water samples. However, no water quality benchmarks exist for screening. 2,3,7,8-TCDD TEQ for the leopard frog water samples ranged from 0.6 to 43.8 µg/L.

Estimating exposure using sediment and water chemistry has several limitations (Landrum et al. 1992); therefore, evaluating the accumulated tissue concentrations of COPCs provides useful information. Associating the effects endpoint with the tissue concentration of the contaminant causing the effect integrates many factors that mediate bioavailability. The basic principle of tissue residue assessment is that there is some proportional relationship between chemical concentrations in tissue at the site of toxic action and the toxic response of interest (Eaton and Klaassen 1995). The amount of contaminant at the toxic site of action in frogs is difficult to calculate; hence, a reasonable substitute is measurement of whole body residues of the contaminant. Toxic effects of many chemicals occur when certain critical body concentrations are reached. Therefore, the internal concentration of a COPC is used as a combined indicator of exposure and bioavailability.

Tissue concentrations of COPCs (metals, PAHs, dioxin/furans) other than PCBs were available for five adult experimental frogs (whole body minus egg mass/ovary tissue) and three reference

frog offal tissue samples (whole body minus reproductive tissues) for the leopard frog study. Appendix IX pesticides and metals, dioxins/furans, and PAHs were also measured in one offal sample from a reference specimen, as well as specimens from sites W-9a, W-7a, EW-3 (two samples), and W-1 (4.3, 18.0, 30.0, and 0.15 mg/Kg sediment total PCBs, respectively). Total Appendix IX pesticide levels in the reference offal samples ranged from 5.6 to 29.3 µg/kg, and the target site offal samples ranged from 8.9 to 31.1 µg/kg. Total dioxin/furan levels in reference offal samples ranged from ND to 127.7 ng/kg; whereas, offal samples from target site specimens ranged from ND to 21.3 ng/kg. Total PAH levels in reference offal samples ranged from 37.7 to 127.7 µg/kg, and offal samples from the study target sites ranged from 27.9 to 62.1 µg/kg. Sixteen metals were measured in leopard frog tissues, five of which (cadmium, chromium, copper, lead, mercury) are amphibian COPCs. The sixth metal, silver, was not measured in tissue. These metals were detected in all eight tissue samples, with the exception of lead (six samples) and mercury (three samples). The range of concentrations measured in tissues from in the study area generally bracketed the reference sample tissue concentrations, except that the highest concentrations of copper occurred in reference tissues.

R. pipiens tissue samples were analyzed for PAHs. Given that toxic effects of PAHs are known to be additive (Landrum et al. 1992; Swartz et al. 1995) and potentially aggravated with the addition of UV light, upper-bound potential exposure concentrations were derived. PAH concentrations were calculated using three methods (setting the detection limit as the actual value, using one-half the detection limit, and setting the detection limit equal to zero) that provided different levels of conservatism. The most conservative estimate of total PAH concentrations ranged from 0.03 to 0.08 mg/Kg. Dioxin/furan TEQs were calculated using the same bounding approach for ND values used for PAHs. By the most conservative method, dioxin TEQs were estimated to range from 0.056 to 0.106 μg/kg TEQs in *R. pipiens* tissues from the study area, and from 0.54 to 0.59 μg/kg TEQ in the reference tissues. These ranges decreased considerably if zeros were substituted for ND values, but the pattern of higher TEQs in the reference samples was still present.

Three exposure media were evaluated for amphibians: sediments, surface water, and tissue concentrations from samples collected at various stages of the amphibian life cycle (i.e., adult whole body, egg mass, early larval stage, late larval stage, metamorph stage). Contaminant levels in these media were compared to reproductive and developmental effects data obtained in the present study to evaluate relationships between contaminant concentrations in animal tissues and the ambient environment and adverse biological effects. Effects to the leopard frog are presented in this section, with comparisons of biological effects to COPC concentrations in various exposure media.

Endpoints representing each major life stage of leopard frogs were initially evaluated. The approach used to evaluate these endpoints was based on two objectives, determination of relative sensitivity of various life stages and evaluation of COPC concentration-response relationships. Relationships between exposure and effects form the basis of the quantitative concentration-response investigations. Two approaches were used to evaluate the relationships between effects endpoints and exposure routes; 1) a comparison of magnitude of observed effects at each contaminated location relative to the others, in the absence of the reference data, and 2) a comparative assessment that considered the effects from the study target sites in relation to results from reference sites. Because laboratory negative controls were not included in either of the amphibian developmental studies, site-by-site comparison to negative control treatments could not be performed. However, a comparative assessment of effects to COPC gradients was conducted. The evaluation of leopard frog concentration and response data was limited to a more qualitative presentation. Spearman's correlations were conducted only where sufficient paired exposure data existed on adult tissue samples (without the external reference specimens) and sediment total PCB concentrations.

RELATIONSHIP TO THE 2000 R. SYLVATICA VERNAL POOL STUDY

The primary objective in conducting the present study was to collect adequate data to determine if reproduction and development in *R. pipiens* was adversely affected in the lower Housatonic River study area. Further, this study attempted to fill data gaps in our understanding of the

impacts of PCB and PCB-like compound contaminated sediment and water on amphibian development and maturation. In the present study with *R. pipiens*, the most striking effect on the lifecycle of *R. pipiens* was reproduction. Reproductive fitness in specimens collected from the various target site sampling locations was adversely affected. Further, PCBs and the other COPCs appeared to be the primary cause of these effects. Although the developmental phase of the present study in *R. pipiens* was somewhat hampered by a limited number of specimens to work with due to the poor reproductive health of the species in this study area, adverse developmental effects were also found in specimens from the target site sampling locations. As found with the reproductive effects, this response was, at least in part, due to PCB exposure and accumulation.

In contrast, R. sylvatica reproduction did not appear to be adversely affected in the "2000 R. sylvatica Vernal Pool Study." This marked difference in life phase response may be partially explained by the differences in life history strategies between the two species. Adult R. sylvatica females are explosive and, typically, impulsive breeders. The breeding season for R. sylvatica is reasonably short, often over several days to a week period, but extremely intensive. After egg laying is complete, the adults vacate the breeding pools, allowing the progeny to develop on their own. R. pipiens, however, are much more selective and deliberate during breeding season, often requiring several weeks to a month to complete breeding. Unlike R. sylvatica, R. pipiens adults remain in close contact with the egg masses during, at least, part of development. The more deliberate nature of mating and nurturing behavior in R. pipiens may have increased likelihood of adult exposure to environmental contaminants. On the contrary, the more rapid process of mating and less nurturing approach used by R. sylvatica may have decreased the likelihood of adult exposure during breeding. This scenario does not account for exposure and accumulation that occurs during the remainder of the year. Thus, other endocrinological and physiological differences between the species may have conferred sensitivity to a particular phase of the lifecycle. However, in both studies, developmental processes were adversely affected resulting in developmental delay and abnormal development.

Selection of two species with different life history strategies was significantly advantageous to the overall study of the impact of contamination in the lower Housatonic River on local amphibian populations, as these two species broadly account the spectrum of reproductive and developmental strategies used by most amphibian species. However, it should be noted that this study also clearly points out that it cannot be assumed that all amphibian species are similar in terms of lifecycle dynamics, and extrapolation to other amphibian species should still be performed with some sense of caution.

COMPARISON WITH OTHER STUDIES

PCB and PCB-like contaminant concentrations in amphibian tissue collected from the field have been measured primarily in adult specimens, and are typically not accompanied by environmental concentrations. Thus, the presence of the COPCs in amphibian tissues is fairly well documented. However, specific bioconcentration factors (BCFs) have generally not been determined for amphibians. It has been generally assumed, based on several studies described in the following sections, that PCB and PCB-like contaminants accumulate in amphibians at least to the extent found in fish (Eisler, 1986).

Following a fire at a PCB warehouse, Phaneuf et al. (1995) investigated PCB concentrations in several species in both reference locations and downwind along the smoke plume produced by the fire. Total PCB levels in *R. clamitans* (green frog) and *R. pipiens* collected from the plume area were in the order of 94 µg/Kg and were as great as ca. 112 µg/Kg, whereas the mean value from the reference site was 7.5 µg/Kg. The investigators concluded that the measured values in the two frog species were less than that observed in bird eggs, similar to that observed in field mice, and greater than that observed in earthworms, and bird and muskrat liver. In a study designed to evaluate the movement of PCBs through the food chain in a national park in Spain contaminated with PCBs, the Spanish frog (*R. perezi*) was found to have almost 6 times more total PCBs than three different species of fish indigenous to the area (Hernandez et al., 1987). Biomagnification was only evident after frog-eating and fish egg-eating birds were examined. Concentrations in these birds were between 5- to 15-times the levels found in the fish and frogs. Elevated PCB concentrations were also detected in various tissues of mudpuppies (*Necturus maculosus*) collected from the St. Lawrence and Ottawa Rivers of Ontario from 1988 to 1992

(Bonin et al., 1995). Whole body total PCB residues ranged from 0.1 to 1.1 mg/Kg with a mean value of 0.4 mg/Kg. Female gonads contained an average of 0.4 mg/Kg total PCB. The most commonly identified congeners included PCB 118, 153, and 138. These concentrations and congeners were similar to those found in snapping turtle (*Chelydra serpentina*) eggs collected from the same sites. Further study of mudpuppies in the St. Lawrence River by Gendron et al. (1997) found more extensive levels of accumulation, with tissue residues ranging from 0.4 to 58.3 mg/Kg total PCB. However, these investigators also reported that the tissue levels of the non-ortho coplanar PCBs, which are typically the most toxic (Eisler and Beslisle, 1996), were far lower in concentration and ranged from 1.0 to 256.0 μg/Kg.

Under more controlled laboratory conditions, Jung and Walker (1997) evaluated dioxin uptake and depuration in American toads (*Bufo americanus*), *R. pipiens*, and *R. clamitans* exposed to spiked water as eggs or larvae for 24 h. These investigators found that the jelly coat surrounding the egg coat contained only 1.2% to 3.7% of the waterborne dioxin. Both frogs and toads accumulated dioxin in relation to the exposure level, with BCFs for each species ranging from 0.6 to 4.0. Interestingly, *R. pipiens* larvae accumulated 2.5 times more dioxin in 24 h than *B. americanus*. Depuration rates were relatively fast for all three species, with half-lives ranging from 1.0 to 7.3 d. Since PCB exposure in the present study was primarily via sediment exposure the BCFs calculated by Jung and Walker (1997) were not directly comparable to BCFs calculated from this study. However, Huang and Karasov (2000) determined that the half-life of PCB 126 in *R. pipiens* was approximately 763 d, which is substantially different from that found by Jung and Walker (1997) with dioxin. Since this study was conducted using oral dosing of food material (crickets), the difference in the rate of elimination and half-life may be the result of a combination of the different toxicants and exposure pathways evaluated.

Of the data that has been collected in adult *Rana sp.*, whole body total PCB levels vary widely depending on the study. Some of the greater whole PCB tissue residues recorded in previous studies were 2.1 mg Aroclor 1260/Kg dry weight in adult *Ambystoma maculatum* (spotted salamander) (Johnson et al., 1999), 1.6 and 1.7 mg Aroclor 1254:Aroclor 1260/Kg lipid weight in *R. pipiens* and *R. clamitans*, respectively (Gillan et al., 1998). However, few case studies have found whole body levels in ranid species at the concentrations found by these investigators in

more controlled studies. Bonin et al. (1995) found whole body total PCB levels in Necturus maculosus ranging from 113.0 µg/Kg to 1.1 mg/Kg. The whole body total PCB levels found in R. pipiens in our study ranged from 154.0 µg/Kg to 5.4 mg/Kg, with the majority of the samples above 1.8 mg/Kg. These concentrations are generally greater than those found in the previously cited studies. Several investigators have found rather extensive accumulation of PCBs in various adult amphibian tissues including gonads, liver, and eggs (Fontenot et al., 2000; Bonin et al., 1995; Huang et al., 1998; Huang et al., 1999; Huang and Karasov, 2000; and Gendron et al., 1997). In an evaluation of the distribution of PCB 126 in R. pipiens, following oral dosing of PCB-loaded crickets, Huang and Karasov (2000) found the liver, fat bodies, gonads, carcass, skin, and muscle tissue to be the primary organs for PCB retention. In this study, oral dosing of 0.35 or 5.0 mg/Kg in the crickets resulted in PCB bioaccumulation between 300 and 1,000 μg/Kg. In an *in situ* evaluation of the effects and bioaccumulation of Aroclor 1254 in adult R. catesbeiana (bullfrog) and R. clamitans, significant accumulation of PCBs in the liver and eggs was noted (Fontenot et al., 2000). In R. catesbeiana, liver PCB levels of ca. 2.3 ± 3.0 mg/Kg and egg PCB concentrations of 1.4 ± 2.0 mg/Kg were detected. Similar PCB levels in the liver and eggs were detected in R. clamitans. Bonin et al. (1995) found liver and gonad total PCB concentrations as great as 2.2 and 1.8 mg/Kg in Necturus maculosus collected from the Ottawa and St. Lawrence Rivers, respectively. Gendron et al. (1997) reported mean gonad total PCB concentrations ranging from 0.4 mg/Kg (reference site) to as great as 58.2 mg/Kg in *Necturus* maculosus, at a highly contaminated site. Aside from our studies, few studies (including work by Gutleb et al., 2000) specifically documented the accumulation of PCBs, in this case congener 126, in tadpoles. In that study, the investigators reported stage 25 R. temporaria (common frog) tadpoles containing approximately 5.4 mg PCB 126/Kg lipid weight. Since ambient and tissue total PCB levels were determined in the present study, BCFs for larval specimens were determined. BCFs for larval specimens from sites W-6 and EW-3 and the Aroclor 1260-spiked reference sediment (site MP) treatment were 0.03, 0.04, and 0.02, respectively. These values were somewhat lower than values determined for R. sylvatica in "2000 R. sylvatica Vernal Pool Study". Whole body BCFs determined for adult R. pipiens, which were collected from sites W-9a, W-8, W-7a, W-6, EW-3, and E-1 were 0.45, 0.12, 0.08, 0.86, and 0.17, respectively. Ovary BCF values for specimens collected at sites W-9a, W-7a, W-6, and EW-3 were 5.6, 1.1, 0.4, and 0.2, respectively.

A substantially more limited database exists on the toxicological effects of PCBs in amphibians, particularly in field studies. Birge et al. (1978) found that the 4 d LC50 value for Aroclor 1254 in *R. pipiens*, *B. americanus*, and Fowler's toads (*B. fowleri*) were 3.5, 10.3, and 38.2 μg/Kg, respectively. Sensitivity to Aroclor 1254 and 1016 increased with the age, such that 4 d post-hatch larvae were markedly more sensitive than the immediate post-hatch larvae. Further, the toxicity of the mixtures increased with increasing percent chlorination, which was consistent with other studies with PCBs (Eisler, 1986 and Eisler and Beslisle, 1996). The teratogenic effects of PCBs on amphibians include skeletal defects, such as lordosis and scoliosis, and abdominal edema. These defects reported by Birge et al. (1978) are consistent with the abnormalities found in the present study. Bishop et al. (1991) found significant correlations between increasing malformation rates in snapping turtle embryos and PCB and PCDD/furans levels. However, the increased risk of abnormality was not significantly correlated with toxic equivalents in the eggs, indicating that individual concentrations of PCB congeners may be more important in assessing toxicity to snapping turtle eggs than toxic equivalents (TEQs) derived from rat, fish, and bird assays. Currently no TEQs exist for amphibian species.

Aside from the previously mentioned studies, the propensity of PCBs to induce reproductive and developmental effects in amphibian species is not widely understood. Most studies of PCB accumulation and effects have been performed in adults. However, few have focused on true reproductive endpoints. Of the reproductive effects found in the present study, the most intriguing is the inability of oocytes within female specimens collected from the target sampling sites to develop and mature properly. Exposure to environmental contaminants can adversely affect individuals, as well as, meta-populations of amphibians (Carey and Bryant, 1995). Most studies have focused on effects at the individual level. Extrapolating toxicological effects observed in individual specimens in the laboratory to effects at the meta-population level is extremely difficult and requires an adequate evaluation of adverse responses in the field.

Negative effects at the meta-population level may be the result of multiple responses including lethal responses, sub-lethal responses, and modest changes in biochemical homeostasis (Blondeau and Baulieu, 1984; Kirk, 1988; Carey and Bryant, 1995; and Pickford and Morris, 1999). Sub-lethal responses include malformation, growth reduction and developmental delay.

Changes in biochemical homeostasis in amphibians resulting from pertubation of critical aspects of the endocrine system, such as reproductive hormonal pathways and the thyroid axis also provide additional stress.

Amphibian reproduction can be perturbed at a myriad of different sites within the body including, the brain, pituitary, thyroid, gonad, and liver (Pickford and Morris, 1999). Of these systems, the gonads appear to be a primary site of action for many EDCs in several species. For example, abnormal ovaries in female juvenile alligators from Lake Apopka, Florida have been identified in earlier studies (Cooke, 1971; Guillette et al., 1994; Crain et al., 1997; Guillette et al., 1995a; and Guillette et al., 1995b). The biochemical and histopathological effects of organochlorine pesticides and polynuclear aromatic hydrocarbons (PAHs) on the ovaries of fish have been documented (NIOSH, 1977 and Thomas and Budiantara, 1995). Thus, not only are EDCs capable of disrupting reproductive function by perturbing endocrine systems in adults, but also by inducing abnormalities in critical reproductive tissues.

The maturation of the amphibian oocyte represents the final stage of oogenesis, which ultimately prepares the oocyte for fertilization. Oocyte maturation is marked morphologically by germinal vesicle breakdown (GVBD) (Baulieu et al., 1978), and is induced by progesterone (Schuetz, 1967). Thus, maturation of the oocyte could potentially be disrupted by EDCs. Disruption of oocyte maturation events in *Rana pipiens* (Lin and Schuetz, 1983) and *X. laevis* (Baulieu et al., 1978) by estradiol and a synthetic estrogen has been demonstrated previously. Thus, maturation of the oocyte could potentially be disrupted by EDCs. Pickford and Morris (1999) previously hypothesized that progesterone-induced maturation of amphibian oocytes could be disrupted by environmental pollutants with anti-progestin activity.

The intriguing aspects of our findings in the present study were tied primarily to recent studies conducted, independently from this project, in our laboratory. We recently performed a preliminary study comparing the GVBD inhibition potential and OMPR binding affinity of Aroclor 1260, dieldrin, and several other toxicants using a high-throughput, laboratory-based oocyte GVBD assay (Fort et al., 2002, and D.J. Fort et al., in press). The relative GVBD inhibitory potential of the test substances evaluated was: ethinyl estradiol>>Aroclor

1260>atrazine>dieldrin. The relative binding affinity of these toxicants to the OMPR was expressed as: progesterone>>ethinyl estradiol (inhibitory)>testosterone (stimulatory)>atrazine (inhibitory)>Aroclor 1260 (inhibitory)>dieldrin (inhibitory). Washout studies, however, indicated that although the competitive binding affinity of ethinyl estradiol for the OMPR was the greatest of the compounds evaluated, testosterone, Aroclor 1260, and dieldrin were more tightly bound to the OMPR than ethinyl estradiol. These results suggested that organochlorine pesticides (methoxychlor is also an OMPR antagonist [Pickford and Morris, 1999]), and PCBs had the potential to alter oocyte maturation. Considering the large difference between the total PCB levels and the PAHs, dioxins/furans, and metals in the adult females, it seemed plausible that PCB and PCB-like COPCs may have been responsible for the inhibition of oocyte maturation. Gendron et al. (1997) found decreased corticosterone production in hypothalmopituitary axes of female *Necturus* exposed to PCBs in the wild. Thus, it is likely that PCB and PCB-like COPCS may have affected female reproduction at various biological sites within the organism. It is also interesting to note that corticosterone is a strong natural agonist of the OMPR and an inducer of precocious metamorphosis in amphibians. On a larger scale, these additional studies provide some mechanistic evidence for the disruption of reproductive fitness in amphibians by several of the COPCs evaluated in the present study, including PCB and PCB-like COPCs.

Virtually no information exists on the effects of PCBs on male reproductive status. A recent study (Travera Mendosa et al., 2001) indicated that several classes of organic contaminants were capable of altering various aspects of gonadal differentiation in larval aged amphibian tadpoles. We have noted the adverse impact of organic contaminants on male reproductive fitness (Fort et al., 2001). Additional studies will be required to determine which specific processes of gonadal differentiation and spermatogenesis are affected. The biological impact of reducing the number of sperm cells and increasing the rate of sperm cell dysmorphogenesis on reproductive performance also needs to be addressed so that these effects can be translated to effects at the local population level.

Slightly more information is available on the effects of PCB and PCB-like contaminants on amphibian development. This may be due to the general thought that early life-stage amphibians

are likely to be the most sensitive to exposure to PCBs in the environment. No significant effects of PCB 126 exposure (0.05-50 µg/L) in *R. pipiens* and *R. clamitans* tadpoles on hatching success, early malformations, body weight, snout-vent length (SVL), or organ mass weight were found by Rosenshield et al. (1999). These investigators, however, did find a decrease in survival and swimming speed, and an increase in abdominal edema in later stage tadpoles at the highest concentration tested. In the same study, an increasing proportion of metamorphosed specimens were found with increasing PCB concentration in both species, with the exception of the highest concentration, which was developmentally toxic. In the present study, as opposed to the "2000 *Rana sylvatica* Vernal Pool Study", we did not observe this trend of increasing numbers of metamorphosed tadpoles from field collected egg masses from the more highly contaminated sampling sites. However, in the present study, more rapid embryo-larval lethality substantially reduced the number of specimens able to undergo metamorphosis, making evaluation of effects on metamorphosis difficult. It is plausible, as was noted by Rosenshield et al. (1999), that the developmental effects observed in this study, may have masked potential effects on metamorphosis.

In an *in situ* evaluation of the effects and bioaccumulation of Aroclor 1254 in *R. catesbeiana* and *R. clamitans*, by Fontenot et al. (2000), no effects on SVL and body weight were found. Jofre and Karasov (2000) found similar results, including an increase in percent metamorphosis, but that the time to metamorphosis was unaffected. These investigators also found increased incidence of edema in *R. clamitans* and *R. pipiens* exposed to 0.005-50 µg/L PCB 126. Gutleb et al. (1999) found no increase in early embryo-larval malformations or detrimental effects on growth in *X. laevis* exposed to 1.1 nM to 1.2 mM Aroclor 1254 for 4 d. However, these investigators did find that administration of Clophen A50 to females prior to breeding, in *X. laevis* and *R. temporaria*, altered retinoid signally processes in developing larvae. *X. laevis* larvae exposed for 80 d to 7.7 pM-6.4 µM PCB 126 showed increasing numbers of malformations, including those types mentioned previously. Gutleb et al. (2000) found that administration of mixtures of Clophen A50 and PCB 126 caused prominent tail (including notochord) and eye malformations, in addition to fin and depigmentation defects, and edema. Finally, studies conducted by Reeder et al. (1998) found increased male:female sex ratios in cricket frogs (*Acris crepitans*) found at sites with high PCB and PCDF concentrations. The

primary effects documented in adult specimens, including recently metamorphosed animals, included necrosis of the kidney, and discoloration and necrosis of the liver (Huang et al., 1998). Of these malformations, the eye and fin malformations were perhaps the most intriguing, based on the consistency of this finding and potential connection to the disruption of retinoic acid homeostasis in the developing embryo. Since induction of lens development of the eye is induced by the biological morphogen, retinoic acid, disruption of this process may result in abnormal development of the eye. Retinoic acid signaling pathways are also required for normal development in amphibians and fish (Sive et al., 1990 and Vandersea et al., 1998). Huang et al. (2001) found that R. pipiens exposed to PCB 126 showed marked signs of oxidative stress.

Two recent studies, conducted by Kadokami et al. (2002) and Savage et al. (2002), further describe the potential effects of PCBs, as well as PCDDs and PCDFs, on amphibian development. The first study attempted to link the exposure to and accumulation of co-planar PCBs, PCDDs, and PCDFs on the occurrence of limb deformities in R. ornativentris (mountain brown frog) and R. japonica (Japanese brown frog) at a contaminated site relative to two selected reference sites. The incidence of forelimb malformation, characterized as polydactyly, in the effected site was ca. 1.0-2.0%, whereas the baseline effect was estimated to be approximately 0.1%. Since the whole body tissue concentrations of the contaminants of concern were similar between normal specimens collected at the target site and the reference site, the investigators concluded that this specific limb malformation was not the result of exposure to these contaminants. The total co-planar PCB levels recorded in the adult whole bodies of target sites and reference specimens (n=15 for target sites and n=2 for the reference site) ranged from 134.0 to 618.0 µg/Kg. No investigation of other potential causes of limb malformation, including parasites, was discussed. Further, the investigators only evaluated normal adult specimens and did not evaluate abnormal specimens of varying ages to evaluate potential differences with the normal specimens, limiting their ability to establish the conclusions drawn. In the present study and the "2000 Rana sylvatica Vernal Pool Study", the incidence of limb defects was much less than the characteristic facial, mouth, and tail malformations. In the study by Savage et al. (2002), the effect of PCB-contaminated sediment, from Franklin County, New York, on developing R. sylvatica was evaluated. Healthy R. sylvatica tadpoles from an external site were exposed to either 20 or 40 g of sediment, originally containing ca. 326.0 mg/Kg total PCBs, for

12 d with mortality and behavioral effects (activity and swimming speed) monitored. Further, two different exposure scenarios either allowed the tadpoles to come in direct contact with the sediment or not have direct contact with the sediment. In either case, the specimens exposed to 40 g of sediment accumulated approximately 128.0 and 33.0 mg/Kg total PCBs in the sediment contact and non-contact treatments, respectively. Likewise, tadpoles exposed to the 20 g sediment treatment (sediment contact/non-contact) accumulated total PCB levels of 22.0 and 6.0 mg/Kg. Regardless of amount of sediment used, significant larval mortality was observed. However, greater mortality was noted in the specimens exposed directly to the sediment than in those in the non-contact treatment. These investigators also found that swimming behavior and activity were, likewise, affected by these treatments as well. However, a greater effect on activity was noted in the non-direct sediment contact treatments. These results were also similar to those found in the present study, as well as the "2000 *R. sylvatica* Vernal Pool Study".

Results from the previous studies described in the preceding paragraphs were reasonably similar to the results obtained in the present study. These previous studies point out that PCB and PCB-like contaminants are capable of altering normal reproductive function, inducing abnormal development, altering metamorphic patterns and sexual development, and causing organ system pathology. The malformations observed in previous studies were similar to those observed in the present study. Although the gonads have been a primary focus for bioaccumulation of PCB and PCB-like contaminants, little previous work has been performed to understand abnormalities in gonad development in relation to PCB exposure. In addition, an increase in the percent of specimens that metamorphosed and pigmentation problems associated with improper development of the skin was also observed in the present study. Overall, the results from the present study are more dramatic than those reported previously. However, based on sediment PCB levels and tissue residues, the lower Housatonic River study area was appreciably more contaminated that the sites studied in the other reports discussed.

Huang and Karasov (2000) made an astute observation in their studies of liver pathology in *R. pipiens* exposed to radio labeled PCB 126. These investigators suggested that liver pathology was not necessarily related to the dose administered, but was better correlated with the length of exposure in adult specimens. Trans-generational transport of the COPCs may play a more

significant role in early developmental toxicity. However, data gaps prevent us from determining the impact of trans-generational contaminant transfer on longer-term developmental processes. It is important to understand that relationships between time of exposure, tissue accumulation, and effects induced are not necessarily significant in the induction of early embryo-larval malformations. As was found in this study, the relationship between early embryo-larval malformations and tissue residues was usually not strong. More important was the exposure to the developmentally toxic material at critical time periods, or windows, during development. In this case, if exposure occurs at the appropriate concentration at a critical time of development, an abnormality may result. Because this dichotomy between short-term embryological and longer-term developmental and pathological effects exists, determination of toxic thresholds and adequate protection levels is extremely difficult. The extent of contamination in the Lower Housatonic River study area compounds this difficulty.

Results from the present study, as well as, most studies conducted to date have focused primarily on effects at either the individual level or the local population level. In fact, few studies, if any, adequately combined both field and laboratory components, nor provide extrapolation of laboratory-based individual data to field-based local population effects (Fort and McLaughlin, in press). The impact of organochlorine contamination (primarily PCBs) on amphibian populations in Southwestern Michigan was recently evaluated by Glennemeier and Begnoche (2002). Although these investigators found toxicological effects of PCB contaminated sediment in developing R. pipiens and R. utricularia larvae, no apparent effects were observed at the population level. Population surveys were based on three separate calling surveys conducted over an unknown portion of one year (1997) and limited time-constrained visual encounter surveys during and unknown portion of 1998. These investigators found that ranid adults and larvae collected from the field sites contained total PCB levels lower than that found in the sediments. The maximum total sediment PCB levels in the sediment in the Glennemeier and Begnoche (2002) study was 39 mg/Kg total PCBs. Glennemeier and Begnoche (2002) hypothesized that the apparent lack of population-level effects of PCBs in the field could be explained by limited contaminant accumulation rather than low physiological sensitivity to chronic PCB exposure. This work adds to a growing controversy over the actual sensitivity of amphibian populations to organochlorine contaminants. Glennemeier and Begnoche (2002)

studies support studies by Fontenot et al. (1996) and Harris et al. (1998a and 1998b) that have suggested that amphibian populations are less negatively affected than other taxa by organochlorine contaminants.

The adequacy of the population surveys from the Glennemeier and Begnoche (2002) is difficult to determine due to both the limited nature of the surveys and the lack of adequate population modeling. It is likely that without modeling over a five to ten year period, negative population effects would not necessarily be observed. In addition, the suggestion that bioaccumulation is directly relative to biological effects and that population level effects will not be observed in taxa that do not extensively bioaccumulate PCBs is not necessarily founded as biotic and abiotic exposure during critical phases of the lifecycle is more likely to be significant factor. In addition, accumulation of contaminants, including the COPCs considered in the present study, in amphibians should not necessarily be assessed based on whole body analysis, since critical tissues, such as the ovary and liver, tend to accumulate substantially more PCBs than the remainder of the body. The present study strongly suggested that the reproductive organs in female R. pipiens were not only a toxicological target, but also a site for extensive bioaccumulation relative to the whole body. Finally, if Huang and Karasov (2000) are correct in their assertion of the importance of the temporal variable in mediating the toxicological effects of PCBs in anurans, the length of exposure during critical periods of the lifecycle may be more important than the actual exposure concentration or extent of accumulation.

It is possible that more significant remediation standards for these COPCs in the environment will be required to protect amphibians in the affected area from accumulation and potential longer-term effects than shorter-term early developmental effects. Both outcomes must be considered to adequately protect amphibians from the adverse effects of PCBs in the environment. However, future studies are needed to directly compare the individual and local population level sensitivities to laboratory and field exposure to PCBs.

CONCLUSIONS

Results from the present study demonstrated the negative impact of a myriad of contaminants, most notably PCB and other COPCs, on *R. pipiens* reproduction, development, and maturation in the Lower Housatonic River watershed. Of the effects detected, however, the most striking effect observed was on reproductive fitness. Reproductive fitness was compromised in both male and female specimens, with the most marked toxicological effects being noted in the females evaluated. Elevated PCB residues were found in various *R. pipiens* tissues evaluated throughout this study. While the leopard frog study cannot unequivocally implicate PCBs as the primary contaminant responsible for the observed effects in the leopard frogs, the accumulation of other COPCs in tissue samples was not as great as that of PCB accumulation. The concentrations of the other COPCs detected in specimen tissue samples from target sites were not appreciably greater, and occasionally less than levels found in reference specimens. For example:

- Two of the greatest total metals concentrations came from reference animals. The
 greatest total metals value for a target site specimen was within the range of the two
 reference values.
- 2) The greatest measured total pesticides concentration in the reference samples was 30.0 ng/g. The greatest measured value in the target site specimens was 31.0 ng/g. Overall, tissue concentrations in the target site specimens were within the same range as the reference specimens.
- 3) Dioxins and furans were not detected in the adult experimental analysis frogs. The greatest total dioxin/furan value detected was from a reference animal (128 pg/g).
- 4) The greatest measured total PAH concentration was in a reference female.
- 5) The target specimens' tissue total PCB concentrations were frequently one or more orders of magnitude greater than levels measured in the reference specimens.

The extent of bioaccumulation was determined by both geographical and temporal factors. Thus, both the location of the adult frogs and developing egg masses, and duration of environmental

exposure appeared to determine the extent of contaminant accumulation in the tissue. Reasonably strong relationships were established between the incidence of reproductive stress and embryo-larval malformation, and levels of PCBs and other COPCs in both sediment and respective tissues. Results from the present study suggested that both maternal transfer and environmental exposure and accumulation of PCBs contributed to the adverse developmental effects observed. Although complex non-interactive and interactive relationships between the contaminants identified and the influence of other non-chemical stressors must be considered, results from the present study indicated that the most significant factor in the toxicological effects observed was exposure and accumulation of PCB and other COPCs during critical phases of the life-cycle. Further, it was nearly impossible to discriminate the effects resulting from exposure to PCBs relative to those induced by PCB-like COPCs. Overall, this study has identified a biologically significant impact of PCBs and other COPCs on reproductive stress observed in *R. pipiens*.

REFERENCES

Ankley, G.T., Tietge, J.E., Defoe, D.L., Jensen, D.M., Holcombe, G.W., Durham, E.J., and S.A. Daimond. Effects of Ultraviolet Light and Methoprene on Survival and Development of *Rana Pipiens*. Environmental Toxicology and Chemistry 17:2530-2542, 1998.

ASTM. Standard guide for conducting the Frog Embryo Teratogenesis Assay - *Xenopus* (FETAX). E1439-91, 1998.

Bantle, J.A., Dumont, J.N., Finch, R.A., Linder, G.L., and D.J. Fort. *Atlas of Abnormalities, A Guide for the Performance of FETAX, Second Edition*. Oklahoma State University Press, Stillwater, OK. 1998.

Birge, W.J., Black, J.A., and A.G. Westerman. Effects of polychlorinated biphenyl compounds and proposed PCB-replacement products on embryo-larval stages of fish and amphibians. Lexington, KY: University of Kentucky. 1-33, 1978.

Bishop, C.A., Brooks, R.J., Carey, J.H., Ng, P., Norstrom, R.J., and D.R.S. Lean. The case for a cause-effect linkage between environmental contamination and development in eggs of the common snapping turtle (*Chelydra s.serpentina*) from Ontario, Canada. J. Toxicol. Environ. Health. 33:521-547, 1991.

Baulieu, E.-E., Godeau, F., Schorderet, M. and S. Schorderet-Slatkine. Steroid-induced meiotic division in *Xenopus laevis* oocytes: surface and calcium. Nature 275:593-598, 1978.

Blondeau J.P. and E.E Baulieu. Progesterone receptor characterized by photoaffinity labeling in the plasma membrane of *Xenopus laevis* oocytes. Biochem. J. 219:785-792, 1984.

Bonin, J., DesGranges, J.-L., Bishop, C.A., Rodrigue, J., Gendron, A., and J.E. Elliott. Comparative study of contaminants in the mudpuppy (*Amphibia*) and the common snapping

turtle (*Reptilia*), St. Lawrence River, Canada. Arch. Environ. Contam. Toxicol. 28:184-194, 1995.

Carolina Biological Supply Company. *Reptiles and Amphibians: Care and Culture*. ISBN: 0-89278-040-1. Carolina Biological Supply Company, Burlington, NC. 1993.

Carey, C. and C.J. Bryant. Possible interrelations among environmental toxicants, amphibian development, and decline of amphibian populations. Environ. Health Perspect. 103:13-17, 1995.

Cooke, A.S. Selective predation by newts on frog tadpoles treated with DDT. Nature. 229:275-276, 1971.

Crain, D.A., Guillette, L.J. Jr., Rooney, A.A., and D.B. Pickford. Alterations in steroidogenesis in alligators (*Alligator mississippiensis*) exposed naturally and experimentally to environmental contaminants. Environ. Health Perspect. 105:528-533, 1997.

Eaton, D.L. and C.D. Klaassen. Principles of toxicology in *Casarett and Doulls toxicology- The Basic Science of Poisons, 5th Edition*. C.D. Klaassen, Editor. McGraw-Hill, New York, NY. pp. 13-33. 1995.

Edginton, A. Review of amphibian culturing and toxicity testing procedures. Method development and applications section, Environmental technology centre, Environment Canada. 2001.

Dickerson, M.C. *The Frog Book: North American Toads and Frogs*. Dover Publications, Inc., New York, NY. 1969.

Dumont, J.N. Oogenesis in *Xenopus laevis* (Daudin). I. Stages of oocyte development in laboratory maintained animals. J. Morphol. 136:153-180, 1972.

Eisler, R. Polyaromatic hydrocarbon hazards to fish, wildlife, and invertebrates: a synoptic review. U.S. Fish and Wildlife Service, Biol. Report 85 (1.8), Washington D.C. 1986.

Eisler, R. and A.A Beslisle. Planar PCB hazards to fish, wildlife, and invertebrates: a synoptic review. National Biological Service Report 31, Washington D.C. 1996.

EPA. EPA/REAC Standard Operating Procedures – Sample Documentation. SOP#2004, U.S. EPA Contract 68-03-3482, October 3, 1994.

Fontenot, L.W., Noblet, G.P., Akins, J.M., Stephens, M.D., and G.P. Cobb. Bioaccumulation of polychlorinated biphenyls in ranid frogs and northern water snakes from a hazardous waste site and contaminated watershed. Chemosphere. 40:803-809, 2000.

Fontenot, L.W., Noblet G.P., and S.G. Platt. A survey of herpetfauna inhabiting polychlorinated biphenyl contaminated and reference watersheds in Pickens County, South Carolina. Journal of the Elisha Mitchell Scientific Society. 112:20-30, 1996.

Fort, D.J., McLaughlin, D.W., Rogers, R.L., and B.O. Buzzard. Effects of endocrine disruptive chemicals on germinal vesicle breakdown in *Xenopus* in vitro. Drug Chem. Toxicol. 25(3):293-308, 2002.

Fort, D.J. and D.W. McLaughlin. "Establishing cause-effect relationships for chemical stressors in amphibians: providing adequate data for the ERA," Multiple stressor effects in relation to declining amphibian populations, ASTM STP 1443. Linder, G.L., Little, E.E., Krest, S., and Sparling, D. Eds. American Society for Testing and Materials, West Conshohocken, PA, 2003. In press.

Fort, D.J., Propst, T.L., Stover, E.L., Helgen, J.C., Levey, R., Gallagher, K., and J.G. Burkhart. Effects of pond water, sediment, and sediment extracts from Minnesota and Vermont on early development and metamorphosis in *Xenopus*. Environ. Toxicol. Chem. 18(10):2305-2315, 1999a.

Fort, D.J., Rogers, R.L., Copley, H., Bruning, L., Stover, E.L., Helgen, J.C., and J.G. Burkhart. Progress toward identifying causes of mal-development induced in *Xenopus* by pond water and sediment extracts from Minnesota. Environ. Toxicol. Chem. 18(10):2316-2324, 1999b.

Fort, D.J., Rogers, R.L., Thomas, J.H., Myers, N.K., Buzzard, B.O., and A.M. Noll. Evaluation of germinal vesicle breakdown in *Xenopus* oocytes as an endpoint for measuring endocrine disruption potential: assay modifications. Environmental Toxicol. Chem. In press.

Fort, D.J. and E.L. Stover. Assessing ecological hazard to amphibian populations. *Proceedings* of the 51st Purdue Industrial Waste Conference. Ann Arbor Press, Chelsea, MI. 351-358, 1996a.

Fort, D.J. and E. L. Stover. Effect of low-level copper and pentachlorophenol exposure on various early life stages of *Xenopus laevis*. *Proceedings of the Fifth Environmental Toxicology and Risk Assessment*, ASTM STP 1306, D.A. Bengton and D.S. Henshel, eds. American Society for Testing and Materials, Philadelphia, PA. 188-203, 1996b.

Fort, D.J. and E.L. Stover. Development of short-term, whole embryo assays to evaluate detrimental effects on amphibian limb development and metamorphosis using *Xenopus laevis*. *Proceedings of the Sixth Environmental Toxicology and Risk Assessment*, ASTM STP 1317, F.J. Dwyer, T.R. Doane, and M.L. Hinman, eds. American Society for Testing and Materials, Philadelphia, PA, pp 376-390, 1997a.

Fort, D.J. and E.L. Stover. Significance of experimental design in evaluating ecological hazards of sediments/soils to amphibian species. *Environmental Toxicology and Risk Assessment:*Modeling and Risk Assessment (Sixth Volume), ASTM STP 1317, F. J. Dwyer, T.R. Doane, and M. L. Hinman, eds. American Society for Testing and Materials, Philadelphia, PA. 1997b.

Fort, D.J., Stover, E.L., Bantle, J.A., and R.A. Finch. Evaluation of a reproductive toxicity assay using *Xenopus laevis*: boric acid, cadmium, and ethylene glycol monomethyl ether. J. Appl. Toxicol. 21:41-52, 2001.

Fort, D.J., Stover, E.L., and D. Norton. Ecological hazard assessment of aqueous soil extracts using FETAX. J. Appl. Toxicol. 15:183-191, 1995.

Fort, D.J., Stover, E.L., Strong, P.L., and F.J. Murray. Effect of boron deprivation on reproductive parameters in *Xenopus laevis*. J. Trace Elem. Exp. Med. 12:187-204, 1999.

Fort Environmental Laboratories, Inc. 2000 *Rana sylvatica* Vernal Pool Study, 2003. Gendron, A.D., Bishop, C.A., Fortin, R., and A. Hontela. *In vivo* testing of functional integrity of the corticosterone-progesterone axis in mudpuppy (*Amphibia*) exposed to chlorinated hydrocarbons in the wild. Environ. Toxicol. Chem. 16:1694-1706, 1997.

Gilbert, M., LeClair Jr. R., and R. Fortin. Reproduction of the northern leopard frog in floodplain habitat in the Richelieu River, Quebec, Canada. Journal of Herpetology. 28(4): 465-470, 1994.

Gillan, K.A., Hasspieler, B.M., Russell, R.W., Khosrow, A., and G.D. Haffner. Ecotoxicological studies in amphibian populations of southern Ontario. Great Lakes Res. 24:45-54, 1998.

Glennemeier, K.A. and L.J. Begnoche. Impact of organochlorine contamination on amphibian populations in southwestern Michigan. Journal of Herpetology. 39(2): 233-244, 2002.

Gosner, K.L. A simplified table for staging anuran embryos and larvae with notes on identification. Herpetology. 16:183-190, 1960.

Guillette, L.J. Jr., Gross, T.S., Masson, G.R., Matter, J.M., Percival, H.F., and A.R. Woodward. Developmental abnormalities of the gonad and abnormal sex hormone concentrations in juvenile

alligators from contaminated and control lakes in Florida. Environ. Health Perspect. 102:680-688, 1994.

Guillette, L.J. Jr., Gross, T.S., Gross, D.A., Rooney, A.A., and H.F. Percival. Gonadal steroidogenesis *in vitro* from juvenile alligators obtained from contaminated or control lakes. Environ. Health Perspect. 103(suppl 4):31-36, 1995a.

Guillette, L.J. Jr., Crain, D.A., Rooney, A.A., and D.B. Pickford. Organization versus activation: the role of endocrine-disrupting contaminants (EDCs) during embryonic development in wildlife. Environ. Health Perspect. 103(suppl 7):157-164, 1995b.

Gutleb, A.C., Appelman, J., Bronkhorst, M.C., van den Berg, J.H.J., Spenkelink, A., Brouwer, A., and A.J. Murk. Delayed effects of pre- and early-life time exposure to polychlorinated biphenyls on tadpoles of two amphibian species (*Xenopus laevis* and *Rana temporaria*). Environ. Toxicol. Pharm. 8:1-14, 1999.

Gutleb, A.C., Appelman, J., Bronkhorst, M., van den Berg, J. H. J., and A.J. Murk. Effects of oral exposure to polychlorinated biphenyls (PCBs) on the development and metamorphosis of two amphibian species (*Xenopus laevis* and *Rana temporaria*). Science of the Total Environ. 262:147-157, 2000.

Harris, M.L., Bishop, C.A., Struger, J., Ripley, B., and J.P. Bogart. The functional integrity of Northern Leopard Frog (*Rana pipiens*) and green frog (*Rana clamitans*) populations in orchard wetlands. II. Effects of pesticides and eutrophic conditions on early life stage development. Environ. Toxicol. and Chem. 17:1351-1363, 1998a.

Harris, M.L., Bishop, C.A., Struger, J., van den Heuvel, Van Der Kraak, G., M.R., Dixon, D.G., Ripley, B., and J.P. Bogart. The functional integrity of Northern Leopard Frog (*Rana pipiens*) and green frog (*Rana clamitans*) populations in orchard wetlands. I. Genetics, physiology, and biochemistry of breeding adultsand young-of-the-year. Environ. Toxicol. and Chem. 17:1338-1350, 1998b.

Hernandez, L.M., Rico, M.C., Gonzalez, M.J., Montero, M.C., and M.A. Fernandez. Residues of organochlorine chemicals and concentrations of heavy metals in ciconiforme eggs in relation to diet and habitat. J. Environ. Sci. Health Perspect. 22B:245-258, 1987.

Hicks, C.W. Fundamental Concepts in the Design of Experiments. CBS College Publishing, New York, NY, 1982.

Hine, R.L., Les, B.L., and B.F. Hellmich. Leopard frog populations and mortality in Wisconsin, 1974-1976. Wisconsin Department of Natural Resources, Technical Bulletin No. 122, Madison, WI. . 1981

Huang, Y.W., Hoffman, D.J., and W.H. Karasov. Oxidative stress in PCB 126-exposed frogs, *Rana pipiens*. Abstracts of the Society of Environmental Toxicology and Chemistry (SETAC). 332, 2001.

Huang, Y.-W. and W.H. Karasov. Oral bioavailability and toxicokinetics of 3,3',4,4',5-pentachlorobiphenyl in northern leopard frogs, *Rana pipiens*. Environ. Toxicol. Chem. 19(7):1788-1794, 2000.

Huang, Y.-W., Karasov, W.H., Patanode, K.A., and C.R. Jefcoate. Exposure of northern leopard frogs in the Green Bay ecosystem to polychlorinated biphenyls, polychlorinated dibenzo-*p*-dioxins, and polychlorinated dibenzofurans is measured by direct chemistry but not hepatic ethoxyresorufin-*o*-deethylase activity. Environ. Toxicol. Chem. 18(10):2123-2130, 1999.

Huang, Y.-W., Melancon, M.J., Jung, R.E., and W.H. Karasov. Induction of cytrochrome P450-associated monooxygenases in northern leopard frogs, *Rana pipiens*, by 3,3'4,4'5-pentachlorobiphenyl. Environ. Tox. Chem. 17(8):1564-1569, 1998.

IATA. *Dangerous Goods Regulations*. International Air Transport Association. Montreal, Quebec, Canada. 1993.

Jofre, M.B. and W.H. Karasov. Direct effect of ammonia on three species of North American anuran amphibians. Environ. Toxicol. Chem. 18(8):1806-1812, 2000.

Johnson, M.S., Franke, L.S., Lee, R.B., and S.D. Holladay. Bioaccumulation of 2,4,6-trinitrotoluene and polychlorinated biphenyls through two routes of exposure in a terrestrial amphibian: is the dermal route significant? Environ. Toxicol. Chem. 18(5):873-878, 1999.

Jung, R.E. and M.K. Walker. Effects of 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD) on development of anuran amphibians. Environ. Toxicol. Chem. 16(2):230-240, 1997.

Kadokami, K., Takeishi, M., Kuramoto, M., and Y. Ono. Congener-specific analysis of polychlorinated dibenzo-p-dioxins, dibenzofurans, and coplanar polychlorinated biphenyls in frogs and their habitats, Kitakyushu, Japan. Environ. Toxicol. Chem. 21(1):129-137. Kirk, J.J. 1988. Western spotted frog (*Rana pretiosa*) mortality following forest spraying of DDT. Herpetol. Rev. 19:51-53, 2002.

Landrum, P.F., H. Lee II, and M.J. Lydy. Toxicokinetics in aquatic systems: Model comparisons and use in hazard assessment. *Environmental Toxicology and Chemistry* 11:1709-1725. 1992.

Lin, Y.-W.P. and A.W. Schuetz. *In vitro* estrogen modulation of pituitary and progesterone-induced oocyte maturation in *Rana pipiens*. J. Exp. Zool. 97:281-292, 1983.

Liu, Z and R. Patino. High affinity binding of progesterone to the plasma membrane of *Xenopus* oocytes: characteristics of binding normal developmental control. Biol. Reprod. 49:980-988, 1993.

Merrell, D.J. Life history of the leopard frog, *Rana pipiens*, in Minnesota. Occasional Papers 15, Bell Museum of Natural History, University of Minnesota. 23 pages. 1977.

Nieuwkoop, P.D. and J. Faber. *Normal Table of Xenopus laevis (Daudin)*. Garland Publishing Inc., New York, NY. 1994.

National Institute of Occupational Safety and Health (NIOSH). Registry of Toxic Substances. 1977.

Nussbaum, R.A., Brodie, E.D. Jr., and R.M. Storm. *Amphibians and Reptiles of the Pacific Northwest*. University Press of Idaho, Moscow, Idaho. 1983.

Parris, M.J. Hybidization in leopard frogs (*Rana pipiens* complex): larval fitness components in single-genotype populations and mixtures. Evolution 53:1872-1883, 1999.

Parris, M.J., R.D. Semitsch, and R.D. Sage. Experimental analysis of evolutionary potential of the evolutionary potential of hybridization in leopard frogs (anura: ranidae). J. Evol. Biol. 12:662-671, 1999.

Parris, M.J., C.W. Laird, and R.D. Semlitsch. Differential hybridization on experimental populations of parental and hybrid leopard frog (Rana blairi and Rana sphenocephala) larvae. J. Herpetol. 35:479-485, 2001.

Phaneuf, D., DesGranges, J.L., Plante, N., and J. Rodrigue. Contamination of local wildlife following a fire at a polychlorinated biphenyls warehouse in St. Basile le Grande, Quebec, Canada. Arch. Environ. Contam. Toxicol. 28:145-153, 1995.

Pickford, D.M. and I.D. Morris. Effects of endocrine disrupting contaminants on amphibian oogenesis: methoxychlor inhibits progesterone-induced maturation of *Xenopus laevis* oocytes *in vitro*. Environ. Health Perspect. 107(4):285-292, 1999.

Porter, D.A. and P. Licht. Pituitary responsiveness to superfused GnRH in two species of ranid frogs. Gen. Compar. Endocrinol. 59:308-315, 1985.

Reeder, A.L, Foley, G.L., Nichols, D.K., Hansen, L.G., Wikoff, B., Faeh, S., Eisold, J., Wheeler, M.G., Warner, R., Murphy, J.E., and V.R. Beasley. Forms and prevalence of intersexuality and effects of environmental contaminants on sexuality in cricket frogs (*Acris crepitans*). Environ. Health Perspect. 106:261-266, 1998.

Rosenshield, M.L., Jofre, M.B. and W.H. Karasov. Effects of polychlorinated biphenyl 126 on Green Frog (*Rana clamitans*) and Leopard Frog (*Rana pipiens*) hatching success, development, and metamorphosis. Environ. Toxicol. Chem. 18(11):2478-2486, 1999.

Savage, W.K., Quimby, F.W., and A.P. DeCaprio. Lethal and sublethal effects of polychlorinated biphenyls on *Rana sylvatica* tadpoles. Environ. Toxicol. Chem. 21(1):168-174, 2002.

Schuetz, A.W. Effect of steroids on germinal vesicle of oocytes of the frog (*Rana pipiens*) in *vitro*. Proc. Soc. Exp. Biol. Med. 124:1307, 1967.

Shi, Y.B. Amphibian metamorphosis: from morphology to molecular biology. Wiley-Liss, New York, New York, 288 pages. 2000.

Sive, H.L., Draper, B.W., Harland, R.M., and H. Weintraub. Identification of a retinoic acid-sensitive period during primary axis formation in *Xenopus laevis*. Genes Dev. 4:932-942, 1990.

Stebbins, R.C. and N.W. Cohen. *A Natural History of Amphibians*. Princeton University Press, Princeton, NJ. 1995.

Steel, R.G.D. and J.H. Torrie. *Principles and Procedures of Statistics*. McGraw-Hill, Inc., New York, NY. 1980.

Swartz, R.C., D.W. Schultz, R.J. Ozretich, J.O. Lamberson, F.A. Cole, T.H. DeWitt, M.S. Redmond, and S.P. Ferraro. ΣPAH: A model to predict the toxicity of field-collected marine

sediment contaminated with polycyclic aromatic hydrocarbons. *Environmental Toxicology and Chemistry* 14:1977-1987. 1995.

Tavera Mendosa, L., Ruby, S., Fournier, M., Brousseau, P., Cyr, D., and D. Marcoliese. Influence of atrazine on gonadal differentiation in male *Xenopus laevis* tadpoles during metamorphosis. Abstracts of the Society of Environmental Toxicology and Chemistry (SETAC). 332, 2001.

Thomas, P. and L.Budiantara. Reproductive life history stages sensitive to oil and naphthalene in Atlantic croaker. Marine Environ. Res. 39:147-150, 1995.

Thompson, S.K. Sampling. John Wiley & Sons, Inc., New York, NY. 1992.

Van den Berg, M., L. Birnbaum, A.T.C. Bosveld., B. Brunström, P. Cook, M. Feeley, J.P. Giesy, A. Hanberg, R. Hasegawa, S.W. Kennedy, T. Kubiak, J.C. Larsen, F.X. Rolaf van Leeuwen, A.K.D. Liem, C. Nolt, R.E. Peterson, L. Poellinger, S. Safe, D. Schrenk, D. Tillitt, M. Tysklind, M. Younes, F. Waern, and T. Zacharewski. Toxic equivalency factors (TEFs) for PCBs, PCDDs, PCDFs for humans and wildlife. *Environmental Health Perspectives* 106(12):775–792. 1998.

Vandersea, M.W., Fleming, P., McCarthy, R.A., and D.G. Smith. Fin duplications and deletions induced by disruption of retinoic acid signaling. Dev. Genes Evol. 208:6168, 1998.

Weston. Field Sampling Plan. Roy F. Weston, Inc., West Chester, PA. 1998.

Weston. Quality Assurance Project Plan, General Electric (GE) Housatonic River Project, Pittsfield, Massachusetts. Roy F. Weston, Inc., West Chester, PA, 1999.

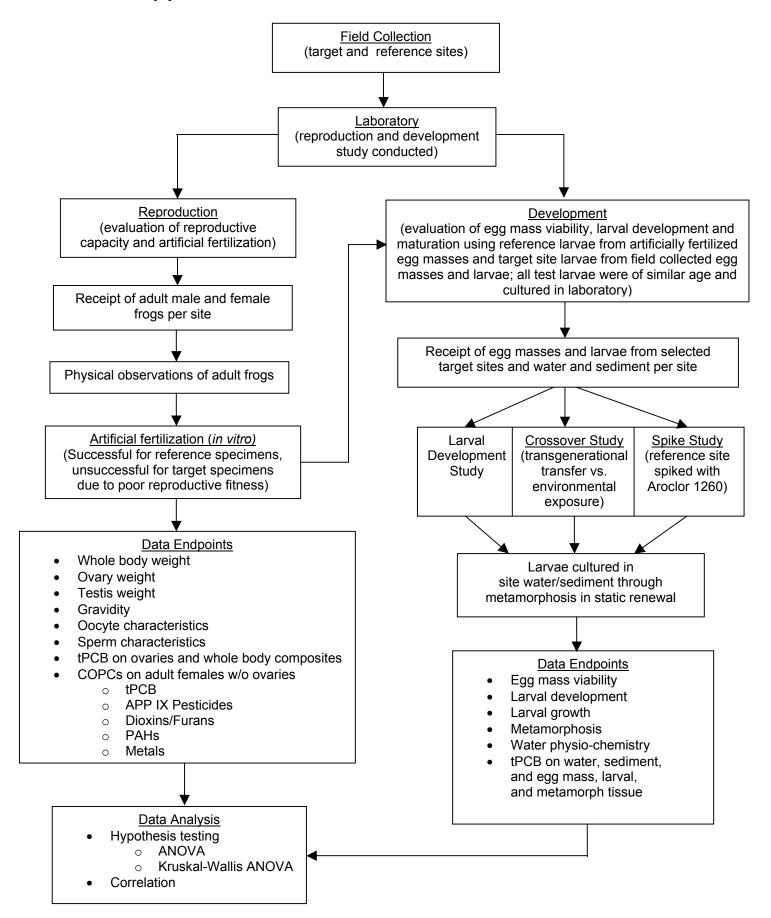
Woodlot Alternatives. Revised Preliminary Draft, Ecological Characterization of the Housatonic River, 2001.

Appendix A

Reproduction / Development Study 2000 Overview

Water, Sediment, and Culture Sample Exposure Scenarios for Developmental, Crossover, and Spike Studies

FORT ENVIRONMENTAL LABORATORIES HOUSATONIC RIVER PROJECT Rana pipiens REPRODUCTION / DEVELOPMENT STUDY 2000 OVERVIEW



HOUSATONIC RIVER PROJECT RANA pipiens DEVELOPMENT STUDY 2000 SITE WATER/SEDIMENT/CULTURE IDENTIFICATION

Site Lo	ocation		Sample Number	
Weston ID	Woodlot ID	Water	Sediment	Larval Culture
TA03RP31	E-5	H3-SW000027-0-0M30 (Rec'd 3/31/00)	H3-SE001246-0-0000 (Rec'd 3/31/00)	No Sample Sent ¹
TA04RP32	W-9a	H3-SW000030-0-0M30 (Rec'd 3/31/00)	H3-SE001249-0-0000 (Rec'd 3/31/00)	No Sample Sent ¹
TA04RP33	W-8	H3-SW000029-0-0M30 (Rec'd 3/31/00)	H3-SE001248-0-0000 (Rec'd 3/31/00)	H3-TA04RP33-0-TP01 ¹ (Rec'd 1 tadpole 5/4/00) No study conducted
TA08RP34	W-7a	H3-SW000028-0-0M30 (Rec'd 3/31, Added 4/19)	H3-SE001247-0-0000 (Rec'd 3/31, Added 5/8) 196.8g sed/3L water	H3-TA08RP34-0-EM01 (Rec'd 4/19/00) (Hatched 4/19-20/00)
TA08RP35	W-6	H3-SW000032-0-0M30 (Rec'd 3/31, Added 5/4)	H3-SE001251-0-0000 (Rec'd 3/31, Added 5/9) 238.2g sed/3L water	H3-TA08RP35-0-TP01 (Rec'd 5/4/00) Stage 20
TA10RP36	W-4	H3-SW000031-0-0M30 (Rec'd 3/31, Added 4/16)	H3-SE001250-0-0000 (Rec'd 3/31, Added 5/8) 247.2g sed/3L water	H3-TA10RP36-0-EM01 H3-TA10RP36-0-EM02 (Rec'd 4/14/00) (Hatched 4/16-17/00)

HOUSATONIC RIVER PROJECT RANA pipiens DEVELOPMENT STUDY 2000 SITE WATER/SEDIMENT/CULTURE IDENTIFICATION

Site Lo	ocation		Sample Number	
Weston ID	Woodlot ID	Water	Sediment	Larval Culture
TA10RP37	EW-3	H3-SW000034-0-0M30 (Rec'd 3/31, Added 5/4)	H3-SE001253-0-0000 (Rec'd 3/31, Added 5/9) 227.1g sed/3L water	H3-TA10RP37-0-TP01 (Rec'd 5/4/00) Stage 20
TA12RP38	E-1	H3-SW000035-0-0M30 (Rec'd 3/31/00)	H3-SE001245-0-0000 (Rec'd 3/31/00)	H3-TA12RP38-0-EM01 H3-TA12RP38-0-EM02 (Rec'd 4/18/00) Salamanders No study conducted
TA12RP39	W-1	H3-SW000033-0-0M30 (Rec'd 3/31, Added 4/20)	H3-SE001252-0-0000 (Rec'd 3/31, Added 5/8) 203.7g sed/3L water	H3-TA12RP39-0-EM01 (Rec'd 4/20/00) (Hatched 4/23-24/00)
TAWLRP25	WML	No Sample Sent	No Sample Sent	No Sample Sent ¹
TAMPRP40	MP	H9-SW000049-0-0Y24 (Rec'd 5/30, Added 6/5)	H9-SE001279-0-0000 (Rec'd 5/30, Added 6/5) 296.4g sed/3L water	R3 ² Larval Composite (Hatched 5/21/00)
TA3MRP26	TP	No Sample Sent	No Sample Sent	No Sample Sent ¹

HOUSATONIC RIVER PROJECT RANA pipiens DEVELOPMENT STUDY 2000 SITE WATER/SEDIMENT/CULTURE IDENTIFICATION

Site Lo	ocation		Sample Number	
Weston ID	Woodlot ID	Water	Sediment	Larval Culture
Crossov	er Study	H3-SW000029-0-0M30	H3-SE001248-0-0000	R1-F001 ³ Larvae
R1 Larvae in TA04RP33 Water/Sediment	W-8	(Rec'd 3/31, Added 5/9)	(Rec'd 3/31, Added 5/9) 251.4g sed/3L water	(Hatched 5/3/00)
Crossov	er Study	H3-SW000029-0-0M30	H3-SE001248-0-0000	R3 ² Larval Composite
R3 Larvae in TA04RP33 Water/Sediment	W-8	(Rec'd 3/31, Added 6/5)	(Rec'd 3/31, Added 6/5) 251.4g sed/3L water	(Hatched 5/21/00)
Crossov	er Study	H9-SW000049-0-0Y24	H9-SE001279-0-0000	R3 ² Larval Composite
R3 Larvae in TAMPRP40 Water/Sediment	MP	(Rec'd 5/30, Added 6/5)	(Rec'd 5/30, Added 6/5) 296.4g sed/3L water	(Hatched 5/21/00)
Spike	Study	H9-SW000049-0-0Y24	H9-SE001279-0-0000	R4 ⁴ Egg Mass
R4 Larvae in TAMPRP40 Water/Sediment (spiked/unspiked)	MP	(Rec'd 5/30, Added 10/30)	(Rec'd 5/30, Added 10/30) 251.4g sed/3L water Spiked w/Arochlor 1260 (30mg/kg sediment)	

¹ Development studies were not conducted on RP Sites 31, 32, 33, 38, 25, and 26 due to limited or no sample available. ² R3 refers to third set of reference adult *R. pipiens* .

³ R1 refers to first set of reference adult *R. pipiens* .

⁴R4 refers to artificially fertilized *R. pipiens* reference egg masses.

Appendix B

Chain-of-Custody Documentation For Field Samples

Chain-of-Custody Documentation For Tissue Samples

Field Samples

Chain-of-Custody Documentation

L	ab Batch Number																Cha	in of	Custo	ody	
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Chain of Custody Lab Batch Number CHAIN-OF-CUSTODY/LAB WORK REQUEST 2066a WESROI-RSTSQ2-07504 Housatonic River Site Number/Type Water Container Solid Client Work Order #_ Water (ml) Work Order #_ Volume Project Contact/Phone # A. Haines
Lab Name STOUER & roup (Per Container) Solid (oz.) Preservatives Water (Per Container) ō Solid Turn Around Time (TAT)_ Deliverable Type:. App.IX VOA App.IX BNA O.C Pest O.P Dioxin/ Furans App.IX Metals ANALYSES Account # _ REQUESTED Matrix Indicate Method Number Lab QC COC Collected Client ID/Description Sample Chosen Matrix Date/Time No. MS MSDILD H3-TAO4RP32-0-FOOL 365/00 1030 001 F002 002 F003 003 1400 004 4005 005 F006 006 1030 007 mool 3/26/00 1400 mo02 800 009 m003 m004 010 M005 011 012 M006 Special Instructions: Matrix Codes Date/Revisions: LAB USE ONLY 1 MISSEXED . CHANGED ON 8/22 Samples were: S - Soil COC Tape was: SD - Sediment CALLED S. CAMPBELL. PAR SO - Solid 1) Shipped 1) Present on Outer Package SL - Sludge Hand Delivered (Y) or (N) W - Water Airbill # O-Oil 2) Unbroken on Outer Package A - Air (Y) or (N) DS - Drum Solids 2) Temperature Blank DL - Drum Liquids Temp. °C 3) Present on Sample L - EP/TCLP Leachate (Y) or (N) WP - Wipes 3) Received in Good Condition X - Other (Y) or (N) 4) Unbroken on Sample F - Fish (Y) or (N) 4) Labels Indicate Properly Preserved Relinquished Received Relinquished Received Date Time (Y) or (N) Date Time COC Record Present Upon by by Sample Reception? 5) Received Within Holding Times (Y) or (N) xott Tu. Candill (Y) or (N) 3/27/00 08/5 9/15/98 Discrepancies Between Samples NOTES: Lix Morgan 3/20/00 0100 Labels and COC Record? (Y) or (N) 98C-2128 Page L of

Lab Batch Number Chain of Custody CHAIN-OF-CUSTODY/LAB WORK REQUEST 20666 WESROI-RETSON 07504 Client Housatonic River Site Number/Type Container Solid Client Work Order # Work Order #_ Water (ml) Volume Project Contact/Phone # A. Haines (Per Container) Solid (oz.) Lab Name STOUER Group Preservatives Water (Per Container) Solid Turn Around Time (TAT) Deliverable Type:_ App.IX VOA App.IX BNA O-C Pest O-P ANALYSES Account # _ REQUESTED Matrix **Indicate Method Number** Lab QC COC Collected Sample Client ID/Description Chosen Matrix Date/Time No. MS MSDE * 143-5E001249-0-0000 013 H3-5W000030-0-0M25 GIA Special Instructions: Matrix Codes Date/Revisions: LAB USE ONLY S - Soil X - Site water/sodiment for Samples were: COC Tape was: SD - Sediment SO - Solid 1) Present on Outer Package 1) Shipped_ SL - Sludge W - Water location TAOHRP32 Hand Delivered _ (N) or (N) Airbill# O - Oil 2) Unbroken on Outer Package A - Air (or (N) DS - Drum Solids 2) Temperature Blank DL - Drum Liquids L - EP/TCLP Leachate Temp. 8 °C 3) Present on Sample (O or (N) WP - Wipes 3) Received in Good Condition X - Other (N) or (N) 4) Unbroken on Sample F - Fish (or (N) 4) Labels Indicate Properly Preserved Relinquished Received Relinquished Received Date Time (N) or (N) Date Time COC Record Present Upon by by Sample Reception? 5) Received Within Holding Times (N) B/27/00 0815 (N) or (N) Discrepancies Between Samples NOTES: Lisa Mougan 3/28/00 0900 Labels and COC Record? (Y) or (N)

Chain of Custody Lab Batch Number CHAIN-OF-CUSTODY/LAB WORK REQUEST 2067 WESRI-RSTS02-07502 Housatonic River Site Number/Type Client _ Water Container Solid Client Work Order #__ Water (ml) Work Order #__ Volume Project Contact/Phone # A. Hignes (Per Container) Solid (oz.) Lab Name STOUER Group Preservatives Water (Per Container) Solid Turn Around Time (TAT)____ Deliverable Type: Dioxin/ Furans App.IX Metals App.IX VOA App.IX BNA O-C Pest. O-P **ANALYSES** CS Account # _____ REOUESTED Matrix **Indicate Method Number** Lab OC. COC Collected **Client ID/Description** Sample Chosen Matrix Date/Time No. MS MSDLD H3-TAOBRP34-0- FOOL 3/25kg 1615 1002 003 H3-TAOGRP34-0-MOWZ 3/26/00 1310 004 FOUR F003 005 006 F005 007 008 H3-5W000026-0-0M25 3/25/20 1600 H3-SE001247-0-0000 010 Date/Revisions: LAB USE ONLY **Matrix Codes Special Instructions:** S - Soil x - Runa Pipiens x - Site water | Sed for Location TAOGRP34 Samples were: COC Tape was: SD - Sediment SO - Solid 1) Shipped _____ or Hand Delivered _____ 1) Present on Outer Package SL - Sludge (N) or (N) W - Water Airbill # O - Oil 2) Unbroken on Outer Package A - Air (f) or (N) 2) Temperature Blank
Temp. _____°C DS - Drum Solids DL - Drum Liquids 3) Present on Sample L - EP/TCLP Leachate (6 or (N) WP - Wipes 3) Received in Good Condition X - Other (A) or (N) 4) Unbroken on Sample Pool W-7a F - Fish (C) or (N) 4) Labels Indicate Properly Preserved Relinquished Received Relinquished Received Time (A) or (N) Date Time Date COC Record Present Upon by by Sample Reception? 5) Received Within Holding Times (**O**) or (N) 367/00 0430 (A) or (N) Discrepancies Between Samples NOTES: Tisa Magan 3/28/00 0900 Labels and COC Record? (Y) or (CD) Page \ of

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Lab N	lame STOUS	2 G-~	MO		_	reservat		Water													k				
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* ×	Runa Site s	sed wa	ter f	roM		O - Oil A - Air									Air	oill#_			_		2) Un	broken	on Out	er Pacl	kage
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Client Housatonic River Site			Number/		Water																	
Client Work Order #			Contai	ner	Solid													4				
Work Order #			Volum		Water (ml)													ĭ				
Project Contact/Phone #A. Ha.	nes		(Per Cont	ainer)	Solid (oz.)													3				
Lab Name STOVER G	roup		Preserva		Water													3				
Turn Around Time (TAT)			(Per Cont	ainer)	Solid											ļ	—	8				
Deliverable Type:							<u></u>						54.4				ļ	12,				
Account #				NALYS QUES		VOA	Pp.I3	O-C Pest.	O-P Pest.	PCB	Herb.	Dioxin/ Furans	pp.IX fetals	CN	8	TOC	Grain Size	17.00 to	\$			
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Sample Client ID/Descrip	tion Q	C	COC	Co	ollected		ľ										T	T -	_ ` _			
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	1 1		W - Wa O - Oil	iter	2. <u>m</u>	use	- <u>Hal</u>	- Cal	<u>ee</u> 0	- L	4	Ha Air	na Den bill#	verea .						(N)		
u= unknown-se	x to be		A A 2		_	<i>)</i> . L		auco	<u>< 10</u>	1462	14	^								n on Ou (N)	ter Paci	kage
determined at	STOVER G	,roug	DL D	rum Liqu	uids 3.—							Te	mperat	ure Dia	unk	°C		3) Pro	esent o	n Samp	le	
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Pool EW-3			X - Oth F - Fish		-							(Y) or	(N)						n on Sai	nple	
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Lab Batch Number															Cha	in of	Custo	ody	
WESRAI-RENSOZ 07505 CHAIN	-OF-CUS	TODY	/LA	AB A	WO	RK	K RE	Q	UE	ST			l		<u> </u>	207	75		
Client Housatonic River Site	Number/Type Container	Water																	
Client Work Order #		Solid						_											
Work Order #	Volume (Per Container)	Water (ml)					_								┼┼		$\vdash \vdash \vdash$		
Project Contact/Phone # A. Haines Lab Name STOUER Group	Preservatives	Solid (oz.) Water						\dashv						-	3	\vdash			
Turn Around Time (TAT)	(Per Container)	Solid													3				
Deliverable Type:															3				
Account #	ANALYS	SES	XI.	Χ _Δ	C St.	P. St.	PCB	æ.	xin/ ans	IX als	7.		ာ	Grain Size	8				
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Lab Matrix				\			V			Ir	dicat	te Me	ethod	Num	ber >	~\			
Sample Client ID/Description QC Chosen MS MSDLD	Matrix Da	ollected te/Time	·												15.3				ĺ
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Work Order # Project Contact/Phone # T Delong A Magnes Lab Name STOVER Group	(Per Container)	Solid (oz.)													3		└ ──'	igsquare	
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Pool EW-3	X - Other F - Fish								(Y) or	(N)				4) Un	broken	n on Sar	mple	
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Client _	Housatonic River Site			Number		Water																	
Client W	ork Order #			Contai	ner	Solid														<u> </u>			
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Project	Contact/Phone # I D	long 1	+ Haine			Solid (oz.)												ļ	5		<u> </u>		
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Client _	Housatonic River Site				Number	Тура	Water	Π	Γ]					_
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Lab	Batch Number																<u></u>	Cha	in of	Custo	ody	
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Client	Housatonic River Site		Number/	Туре	Water																	
Client W	ork Order #	•	Contair	ner	Solid																	
Work Or	der #	<u> </u>	Volun	ne	Water (ml)																	
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Lab Nam	Contact/Phone #T. Delong, ne STOVER Group	· · · · · · · · · · · · · · · · · · ·	Preserva		Water													,				
	ound Time (TAT)		(Per Cont	ainer)	Solid													19				
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Lab Batch Number															Cha	in of	Custo	dy	
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Client Housatonic River Site	Number/Type	Water																	
Client Work Order #	Container	Solid																	
Work Order #	Volume	Water (ml)													<u> </u>				
Project Contact/Phone # 1 De on & / H Hairs	(Per Container)	Solid (oz.)													Cfio				
Project Contact/Phone # T De lon & A Haires Lab Name STUBE Group	Preservatives	Water												ļ					
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Lab Batch Number			~									~			[Cha	in of	Custo	ody	
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Y= Rana Pip	11en S	SO - Solid SL - Slud	d	_							1) Shi	ipped_			_ or			•	n Outer	Packa	ge
1		W - Wate	er	2							Ha	nd Deli	ivered .				•	•	(N)		
		O - Oil A - Air		_							Air	DHI # _							on Ou (N)		kage
		DS - Drui DL - Drui	m Liqu	uids 3.—							2) Ter	mperat mp	ure Bla		°C		•	•	n Samp		
Paol: W-8		L - EP/TO WP - Wir	CLP L										in Goo						n Samp (N)		
		X · Other F · Fish		-				··········			,) or		a con	G111011		4) Un	broker	on Sa	mple	
Relinquished Received Date	II ъ	elinguished		Received	Τ.		1 _						dicate I	Properl	y Prese	erved			(N)		
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Lab Batch Number	CHAIN	_OF_0	פוזי	TODV	т <i>Г</i>	AR '	wc)DI	7 D	FΩ	TIE	ст							Custo	dy	
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Client Housatonic River Site		Number/		Water													2				
Client Work Order #		Contair	er	Solid													the				
Work Order #		Volum		Water (ml)													1/2				
Project Contact/Phone # T. Delong /	Haines	(Per Conta	ainer)	Solid (oz.)													2/4	<u></u>			
Project Contact/Phone # 7. Delong / 1 Lab Name Stover Group		Preserva		Water											<u> </u>		D.	7			
Turn Around Time (TAT)		(Per Cont	amer)	Solid	ļ					ļ								5 4			
Deliverable Type:		ļ.,			<u>.</u>						> 10	y ,					څ.				
Account #			IALYS QUES:		App.IX VOA	App.I3	Set Set	O-P Pest.	PCB	Herb.	Dioxin/ Furans	App.IX Metals	S	۶۶	100	Grain Size	F				
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Pool EW-3		A - Air DS - Dr DL - Dr L - EP/	um Liqu	uids 3.—								mperat mp	ure Bla		°C		()	() or	(N) Samp		Rage
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Relinquished Received Date	Time	elinquished by	i	Received by]	Date	Ti	me			(Y) or	dicate F (N) Within	-			COC	Record	(N) Preser eption?		n
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Dling. 1 4/4/00 4/5/00	0900			· · · · · · · · · · · · · · · · · · ·			+				Label	s and (COC Re	ecord?	-						
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Lab	Batch Number																ļ		Cha	in of	Custo	ody_	
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Special In	structions:	***************************************		Matr	ix Cod	es Da	te/Revi	sions:									LAB	USE	ONLY				
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Client Housatonic River Site		Number/Ty	уре	Water																	
Client Work Order #		Container	r	Solid													3				
Work Order #		Volume		Water (ml)													6				
Project Contact/Phone # T. Delong / A.	Haires	(Per Contair	ner)	Solid (oz.)													12				
Project Contact/Phone # T. Delong f. Lab Name Stover Coroup		Preservativ (Per Contain		Water													de		igspace		
Turn Around Time (TAT)		(Per Contail	iler)	Solid											ļ	 	24	 			
Deliverable Type:		4 274	T 770	DC	×	×		,		 .	/c s	××			-	ļ. <u> </u>	3	$\vdash \vdash$	\vdash		
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TAI2RP39		WP - Wip	es	аспате							3) Re	ceived	in Goo		dition		(Y) or	(N)		
1001 W-1		X - Other F - Fish	•	-) or							non Sar r (N)	nple	
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La	Container Container Solid Volume (Per Container) Solid (oz.) Solid (oz.) Name Solid (oz.) Preservatives (Per Container) Preservatives (Per Container) Solid Around Time (TAT) Verable Type: Solid ANALYSES REQUESTED Matrix QC COC Collected Motrix QC COC Collected Motrix Cocc Collected Motrix Cocc Collected Motrix Cocc Collected Motrix Cocc Collected Motrix Cocc Collected Motrix Cocc Collected Motrix Cocc Collected Motrix Cocc Collected Motrix Cocc Collected Motrix Cocc Collected Motrix Cocc Cocc Collected Motrix Cocc Cocc Collected Motrix Cocc Cocc Collected Motrix Cocc Cocc Collected Motrix Cocc Cocc Cocc Collected Motrix Cocc Cocc Cocc Cocc Cocc Cocc Cocc Coc																Cha	in of	Custo	ody			
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Client _			Number/Type Container Solid																				
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				 				Samples were: 1) Shipped o Hand Delivered Airbill # 2) Temperature Blank										-	 	-	-		\vdash
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X	= Kana pipie	7 S		SO - Se	olid												_ or		1) Pro	esent o	n Outer		gе
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*	Site Sed/Su	1 From		A - Air																	non Ou	ter Pac	kage
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10	cution TAIZRP39	•		WP - V	P- Wipes 3) Received in Good Condition													·		(N)			
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Relingu		Dote	Time R	elinquishe	d	Receive	d	Date	Ti	ime						Properl	y Prese	erved	-	-	r (N) d Preser		,
by	by			by	-	by		Duic	+-				5) Re	ceived	Within	Holdi	ng Tin	nes	Samp	le Rec	eption?		
Dun 1	la M	7, , ,	L - EP/TCLP Leachate WP - Wipes X - Other F - Fish Oate Time Relinquished by Date Time S OO 1300 S Received Within Holding (Y) or (N)												amples		NOTE		()				
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	7 ()										Page.	of	(Y) Or	(11)								
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	Discrepancies Between Sar																						

Lal	Housatonic River Site rk Order # er # ontact/Phone # 7. Delong A. Haine S Ind Time (TAT) e Type: ANALYSES REQUESTED Water Solid Water Solid Water (ml) Solid (oz.) Water Solid Water (ml) Solid (oz.) Preservatives (Per Container) Solid ANALYSES REQUESTED Water Solid Water																	Cha	in of	Custo	ody		
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Work O	rder #	, , ,				Water (ml)		ļ		ļi								ļ	- R	`			
Project	Contact/Phone # 7. Dela	mg / H.	Maines	<u> </u>								ļ				ļ	ļ	ļ	36				
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V	- Runa vinier	75		SD - Se	diment	1.														Таре			
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	7 412 84 39			WP - V	Vipes											od Con	dition				(N)		
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Relinqu	ished Received	Date	Time R		d		1	Date	Т	ime							,	,	COC	Recor	d Prese	nt Upo	n
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Lab	Batch Number]																	Chai	in of	Custo	dy	
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Client	Housatonic River Site			Number/		Water																	
Client Wo	ork Order #			Contair	ıer	Solid													1				
Work Or	der #	4 77		Volum		Water (ml)													7				
Project (Contact/Phone # 7. Dene Stover Grant ound Time (TAT)	long / A.	Haines	(Per Conta		Solid (oz.)	'		igsquare										20		\longrightarrow		\square
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Lab		-	Matrix		<u> </u>		~	+			+		<u> </u>	In	dicat	e Met				₩,			+
Sample No.	Client ID/Descri	ption	QC Chosen MS MSDLD	COC Matrix		ollected te/Time																	
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	TAØ4RP33 9 Pool: W	9 (2) (3)		L - EP/I WP - W		uias						-		np ceived i	in Goo	d Condi				sent on () or	Sample	е	
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_ v ·		4/5/00	1300		土		土						(Y) or	(N)	Holding			(Y	le Rece ') or			
	Lisa A. Mago	Alaloo C	2900		\bot		\bot		\bot				Labels	epancies s and Co or (OC Re	een San cord?	nples	1	NOTES	S:			
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Lal	Container Container Solid Volume (Per Container) Solid (oz.) Name														}				Custo	dy			
WEST &!	CHAIN-OF-CUSTODY/LAB WORK REQUEST Housatonic River Site Number/Type Container Work Order # Order # Cet Contact/Phone # 7. Delong / A. Hains / Preservatives Indicate Methods of the container of the containe													[21	17					
Client _	Housatonic River Site					Water			ļ										1		ļ		<u> </u>
Client W	/ork Order #			Contai	ner	Solid													1/2				
Work O	rder #	1 : /	1 . 1 .			`												<u> </u>	24				
Project	Contact/Phone # 7. D	Whong /	4. Haines	(Per Con	ainer)	Solid (oz.)												ļ	16 3				
Lab Nan	ne Stover G	oup		Preserva			<u> </u>											ļ	1		ļ		-
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			CHAIN-OF-CUSTODY/LAB WORK REQUEST Number/Type Water Solid Water (ml) Solid (oz.)																							
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	Client _		satonic River Site				Number/	Туре	Water													1				
1	Client V	Vork Or	der #				Contai	ner	Solid													1,25				
١	Work C	order#_		·					Water (ml)													,				
	Project	Contac	t/Phone # <u>7 · <i>D</i></u>	clong/	A. Hai	125	(Per Cont	ainer)	Solid (oz.)													3/8				
]	Lab Na	me	Stover a	Soup					Water													10 13				
7	Turn A	round T	ime (TAT)				(Per Cont	ainer)	Solid	_					ļ					<u> </u>	ऻ	12/2	<u> </u>	ļ		
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Lab Batch Number																	Cha	in of	Custo	ody	
WESPOI- 255542-01509	CHAI	N-OF	-CUS	STODY	Y/L	AB	WC	RF	R	EQ	UE	ST					_ (214	13_		
Client Housatonic River Site			er/Type	Water																	
Client Work Order #		Cor	tainer	Solid																	
Work Order #		v	lume	Water (ml)			<u> </u>											-	\sqcup		
Project Contact/Phone # 1. D	Plong / A. Have	(Per C	ontainer)	Solid (oz.)				ļ											\sqcup		
Project Contact/Phone # 1. De Lab Name 570ver 60	ronf	Prese	rvatives ontainer)	Water	_		<u> </u>	ļ									1		\longmapsto		
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X = Ronn pipiens Location: TA12K	1020	w.	- Sludge Water	2	.W 5	1 210	<u>⊢</u> m -	4112	100		Hau	nd Deli	ivered _				(Y) or	(N)		
Localion: INTIZK	T 27	A-	Oil Air	-													2) Un	broke	n on Ou	ter Pacl	kage
Leopard Trues Rep	coduction St.	DS DL	- Drum Sol - Drum Lig	ids juids 3							2) Ter	mperati	ure Bla	ınk	°C				n Samp		
			EP/TCLP I - Wipes	Leachate _									in Goo						n Samp : (N)		
Pool: W-1		х-	Other Fish	-) or		- Com					n on Sar		
Relinguished Received		Relinquis		Received		D :	T						dicate I	Properl	y Prese	erved	-	-	r (N)		
heinquished Received by	Date Time	kennqua by	neu	by		Date	T	ime) or		Ucl.d:	na Ti	200			d Preser æption?		l
Ser Pol	4/1/00 1302) or	Within (N)	HOIGI	ng 11m	ies			(N)		
1 11	77 .				-						Discre	pancie	s Betw				NOTE	S:			
Fise Maga	4/19/00 0900						-					s and C) or	COC Re	ecord?							
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Client V	Vork Order #		Contair	1er	Solid															$oxed{oxed}$		
Work O	order #	Client ID/Description Container Cont																	<u> </u>			
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IuiiiA	Tound Time (TAL)		(202 00.00		Solid			<u> </u>								-	\vdash	200	\vdash			<u> </u>
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	, Manual P		SL - Sh	ıdge		m ~	11110	<u> </u>				1) Sh	ipped _ nd Deli	ivered		_ or				on Outer r (N)		ge
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	· · · · · · · · · · · · · · · · · · ·			um Solie	ds 2		-					2) Te	mperat	ure Bla	ınk					r (N)		
Lo	cation: TAIBRP36				uias							Tei	mp			°C				on Samp		
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10	0/: W-4												•	. ,	Propert	ly Pres	erved			n on Sa or (N)		
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	R. Paul 4/15/00/	0:30																NOIE	ن .			
										L		(Y) or	(N)								
		S-Soil SD-Sediment SO-Solid SL-Sludge W-Water O-Oil A-Air DS-Drum Solids DL-Drum Liquids L-EP/TCLP Leachate WP-Wipes X-Other F-Fish Received Date Time Relinquished Received by by Samples were: 1. Qurong sample number L-M/11/00 2. Samples were: 1) Shipped Hand Delivered Airbill # 2) Temperature Blank Temp. 3) Received in Good Cond (Y) or (N) 4) Labels Indicate Properly (Y) or (N) 5) Received Within Holdin																				

Lal	Ole Client ID/Description QC COC Collected																Cha	in of	Custo	ody_		
WESRO	51-257502 -07505	CHAIN	-OF-	CUS	TOD	Y/LA	AB	WC	ORI	K RI	EQ	UE	ST					_	215	54		
												100	k									
Client W	/ork Order #		Contai	iner	Solid																	
Work O	rder#				Water (ml)													2 L				
Project	Contact/Phone # A Hames/7 L	xLong	<u> </u>		Solid (oz.)											ļ	<u> </u>					
Lab Nan	ne STOVEY Group	·							<u> </u>						<u> </u>			_		<u> </u>		
Turn Ar	ound Time (TAT)	<u> </u>	(Fer Con	taillei)	Solid		<u> </u>		ļ							<u> </u>	<u> </u>	-	33			
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Lab Sample No	-	QC Chosen	Matrix																			
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Client _	Housatonic River Site			Numbe		Water																	
Client V	Vork Order #			Cont	ainer	Solid	1														$\perp \!\!\! \perp \!\!\! \perp$		
Work O	order #	. 11	11 : /	Vol		Water (ml)	↓		ļ											—	+		
Project	Contact/Phone # T Dug me STOUER & ro.	one //ti	Maines	<u> </u>		Solid (oz.)	_	<u> </u>	<u> </u>										50 _	<u> </u>	+-		
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Special	Instructions:				rix Cod	es Dat	te/Revi	sions:									LAB	USE	ONLY	<u>, </u>			
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1 - 10	1. 2 10/2	J ,		DL -	Drum Lic	uids 3. –							Te	mp			°C		3) Pr	esent c	on Samp	ole	
				L - E WP - WP - C S - C F - F	Wipes									ceived		d Con	dition				r (N)		
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Work O	Order #	Li (.Z	Volun (Per Cont	× -	Water (ml)												<u> </u>					
Project	Proder # Contact/Phone # T Deland / A. meStorer Group	Maines	ŧ.		Solid (oz.)							—										
Lab Nai	me Tovel 0-1845		Preserva (Per Cont		Water Solid	-	 	-				-					<u> </u>	18 J		-		
	round Time (TAT)				Solid										<u> </u>			1				
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Lab		Matrix					\			\					te Me	thod	Num	ber	¥			\
Sample No.	Client ID/Description	QC Chosen MS MSD/LI	COC Matrix		lected /Time																	
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1 0	ard frog Reproduct	ion Stud	J DL - Dr	rum Liquio TCLP Lea	ds 3								mp			°C				n Samp	le	
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₩ <u>, , , , , , , , , , , , , , , , , , , </u>	by Hall	1206	by	+	by	\dashv		+					ceived			ng Tin	nes			eption?		
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Lab Bat	ch Number]																	[Cha	in of	Custo	,dy	
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	ana pipiei frak Ropa	ء _ ایم را ا	on⁄i ∠1.	. 4 .	0.02	•		<u>*</u>					-		Air	thill#_					2) Un	ibroker	on Ou	ter Pack	cage
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Lal	b Batch Number															[Cha	in of	Custo	ody	
VE SR4	61-RSTS02-07	CHAIN	-OF-C	CUS	TODY	/L A	AB	WC)RF	R	EQ	UE	ST						220	4		
Client _	Housatonic River Site		Number/1		Water																	
Client W	ork Order #		Contain	er	Solid																	<u></u>
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Project	rder # Contact/Phone # A Huives 77 ne Stove Group	Debox	(Per Conta	iner)	Solid (oz.)																	
Lab Nan	ne SIDEL GROUP		Preservat		Water												ļ	\rightarrow				<u> </u>
	ound Time (TAT)		(Per Conta	imer)	Solid			<u> </u>					-				<u> </u>	1	<u> </u>			<u> </u>
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Sample No.	Client ID/Description	QC Chosen	COC Matrix		ollected te/Time																	
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1-	Kara hilian loom		SO - Sol SL - Slu									1) Sh	pped_	ivered _		or				n Outer (N)	Packa	ige
	(· · · · · · ·)	(swe'	W - Wat	ter	2. —							Ha Aiı	na Den bill#_							(PI) on Ou	ton Do	alraga
Lec	· EW-S (4908-5) (5/3/00	A - Air DS - Dru	um Solie	ds -			<u>i.</u>						ure Blan	_					(N)	ici ra	LKage
	•		DL - Dri L - EP/I	um Liqu	uids 3.—							Te	np	it		°C		3) Pre	esent o	n Samp	le	
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Relinqui		Time Re	linquished	1	Received		Date	T	ime			4) La	oeis ind	dicate P	roperi	y rrese	ervea	_		l Prese	nt Upo	n
by V. ik (by	—	by	-	by	+		+				5) Re	ceived or	Within (N)	Holdi	ng Tim	nes	Samp	le Rec	eption?		
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Lab Batch Number	~		~									~-			ļ		Cha	in of	Custo	ody	
WESADI-R5TSB2-07503	CHAIN	-OF-	CUS	STODY	/L	AB	W()RI	K RI	EQ	UE	ST						220	15		
Client Housatonic River Site		Number/		Water													NG	•			
Client Work Order #		Contai	ner	Solid													4-	ST ST ST ST ST ST ST ST ST ST ST ST ST S	>		
Work Order #		Volur		Water (ml)													LONG				
Project Contact/Phone # Delaw Lab Name STOCK Grown	4 Hains	(Per Cont	ainer)	Solid (oz.)			L										U				<u> </u>
		Preserva (Per Cont		Water		<u> </u>		ļ									-	_	├ ─-!		<u> </u>
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(4700-2)	W - Wa	ater	2						—	Ha Air	nd Del rbill#_	ivered .						(N)		
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		DL - D	rum Liq	uids 3				-		—	2) 1e	mperat mp	ure 1342	ink ·	°C				n Samp		
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		X - Otl F - Fisl		-						-		Or or							n on Sai		
Relinquished Received Date	Time R	elinquishe		Received		Date	T	ime				bels In			y Prese	erved	_		r (N) d Preser		_
by by by	1620	by		by	+	Date	1				5) Re	ceived or	Within	ı Holdi	ng Tin	nes	Samp	le Rec	ception?	п Оро	1
	10 de		_	-	+		1		٨	1	Discr	epancions and (es Betv	veen Sa	amples		NOTE	S:			
Naver program 3/4/0	D 1410				\top		1) or		ecora?							
					\top		1		Page\	of _\											
				 					J				-								

Lab	Batch Number																		Cha	in of	Custo	ody	
WESRA	1+R5+502-075	-11	CHAIN	-OF-0	CUS	TODY	/L	AB	W(DRF	R	EQ	UE	ST						220)6		-
Client	Housatonic River Site			Number/		Water													1				
Client W	ork Order #			Contai	ner	Solid																	
Work Or	der #	. -,	<u> </u>	Volur		Water (ml)																	
Project (Contact/Phone # A Hc ne STOUER G re	ines//	elona	(Per Cont	ainer)	Solid (oz.)																	
Lab Nam	ne STOUELGRE	up .		Preserva		Water																	
Turn Arc	ound Time (TAT)	•		(Per Cont	ainer)	Solid	ļ	<u> </u>									ļ	ļ					
Deliverat	ole Type:	***					<u> </u>	×	-	-			2 8	× ×			<u> </u>		3	!			
Account	#		· · · · · · · · · · · · · · · · · · ·		NALYS QUES		VOA	App.E	Pest .	O-P Pest.	PCB	Herb.	Sioxir Furan	App.IX Metals	CN	۶۶	700	Grain Size	100 P				
Lab			Matrix	1			₹.	▼	<u> </u>		+				ndicat	te Me			<u>~</u>	+	<u> </u>		\
Sample	Client ID/Descrip	ption	QC Chosen	COC Matrix		ollected te/Time													Ĭ				
No.			MS MSD/LI			to Time							<u> </u>										
020 1	13-TAO4RP33-0	- Emol		X	5/3/a	o 1030													X	<u>]</u>			
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Special I	nstructions:			Matri	x Code	es Date	/Revis	sions:									LAB	USE	ONLY	,			
		odd M	445	S - Soil SD - Se		1							Sami	oles we	re:					Таре	was:		
7-	Rana PiDIM - W-8 (1908-	CDD 11.		SO - So	lid	_											_ or		1) Pro	esent o	n Outer	Packag	ge
10c-	W-A (19UP-	5)		SL - Sli W - Wa	ater	2	-						Ha	ipped _ nd Deli	vered_					or or	(N)		
	0 0	,		O - Oil A - Air		_								bill#_					2) Ur	broker	on Ou	ter Pac	kage
					rum Solie rum Liqu								2) Te	mperati mp	ure Bla	nk	°C				(N)		
				L · EP/ WP · V	TCLP Ľ	eachate							l	mp ceived	_						n Samp (N)		
				X - Oth	ier	-					***************************************			or or		d Con	uitioii		4) Un	brokei	ı on Saı	mple	
D-V	1 D	<u> </u>	II p	F - Fish		Received	1		-r				4) La	bels Inc	dicate F	Properl	y Prese	erved	e	01	(N)	_	
Relinquis ↑ by	shed Received by	Date	Time K	elinquishe by	u	keceived by		Date	T	ime				O or					COC	Record	d Preser	nt Upor	1
البلا .	1	5/3/20 1	755		\top	J	\neg		1				5) Re	ceived or	Within (N)	Holdi	ng Tim	nes		or Rec	eption? (N)		
DEPT (MAN	177		-	-				+				_	epancie		een Sa	amples		NOTE		. ,		
	Robert Roger	-5/4/00	1018				-		+-		١ ١	1	Label	s and C	COC Re	ecord?	•						
			ii		╝						Dog L	,	(Y) or									
											Page	. OI											
L		L																		-			

L	ab Batch Number Ø																		Cha	in of	Custo	dy	
Wesk 07	676		CHAI	N-OF	·CUS	STODY	//L /	AB	WC	DRF	K R	EQ	UE	ST					,	<u> 223</u>	6_	<u> </u>	
Client	Housatonic River Site				er/Type	Water													146	466	٣		
Client \	Work Order #			Con	ainer	Solid													- 4	806			
Work (Order #			Vol	ume	Water (ml)													1000				
Projec	t Contact/Phone #	bry A	L. Haine	S (Per Co	ntainer)	Solid (oz.)														りは			
Lab Na	t Contact/Phone # T De same STOUER GY	Coup!		Prese	vatives	Water														4			
	round Time (TAT)	1		(Per Co	ntainer)	Solid														<u> </u>	igsquare		
Deliver	able Type:						ļ.,		<u> </u>								<u> </u>		73	50			
1	nt #				ANALY: EQUES		VOA	App.IX	공 왕 왕	O-P Pest.	PCB	Herb.	Dioxin/ Furans	App.IX Metals	CN	۶	TOC	Grain Size	Prof.	\$ 2			
Lab			Matrix		T			₩			' \			Ir	idicat	te Me	thod	Num	ber				$\overline{\downarrow}$
Sample No.	Client ID/Descript	tion	QC Choser MS MSI	COC Matri		ollected nte/Time					,										·		
001	H9-SE001279-0-0	Y2217		50	chul	0501 06			<u> </u>											X			
	49-5Warx049-0-0			کرا	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	<u>ا الم</u>	†												X	-			_
000	11 30000 41-0-0	 	-	12	1 -			 	 														
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															ļ			<u> </u>		Ь_	<u> </u>		
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																	<u> </u>		<u> </u>				
Special	Instructions:				trix Cod	es Date	/Revi	sions:									LAB	USE (ONLY	,			
١.	1			S · S SD ·	oil Sediment	1.0	Chec	<u>kod i</u>	nay	751 562.	503	, ,	Samp	oles we	re:				COC	Tape	was:		-
Mudk	ly Koncl				Solid Sludge	14	nste o	nd Ot	Kst	<u>sø2.</u>	Lm G	11/20	1) Sh	ipped _ nd Deli			_ or		1) Pre	sent or	n Outer	Packag	e
	() • • • •				Water	2							Ha Aiı	nd Deli bill#_	ivered _						(N)		
	CITTE UD			A - A	\ir	-							ŀ						2) Un	broken	on Ou (N)	ter Pack	age
	2116 70			DL ·	Drum Sol	uids 3. —							2) Te	mperati mp	ure Bla 10	trik	°C		-	_	n Samp	le	
	Instructions: Hy Pond SITE 40			L - I WP	P/TCLP I - Wipes	_eachate						—	ł	ceived						Or			
				X - 0 F - H	Other	-								⊃ or		- JUIN					on Sar	nple	
Dalin	wished Bassined	. Т		Relinquis		Received	Т		T _	. 1				bels Inc		Properl	y Prese	rved			(N)		
Reling	uished Received by	Date	Time	kennquis by	icu	by		Date	T	ime				or or		** * * * *	 .				d Preser eption?	it Upon	
1 1 11	A MA	ار ایرار	1200		$\neg \neg$	~ y			1					ceived		Holdi	ng Tim	es		ole Rece			
S VINT			1200						+				_	ور epancie		veen Sa	mples		NOTE				
	Julia Erleck:	5/25/60	9:30								1	۱ ا	Label	s and C	COC Re	ecord?	p.103			-			
971	V										[]	$\ \cdot\ $	(Y) or (•							
2-7-2-8							\top		1		Page	of 🗘											
5	1											l											

WESRØI-RSTSØZ													_						
Lab Batch Number															Cha	in of	Custo	dy	
07688 07691 CHAIN	-OF-CUS	STODY	/LA	AB V	WO	RK	R	EQ	UE	ST						223	7		
Client Housatonic River Site	Number/Type	Water													IPL				
Client Work Order #	Container	Solid														,			
Work Order #	Volume	Water (ml)												\Box	55-9	al		\longrightarrow	
Project Contact/Phone # T Debug A. Haines	(Per Container)	Solid (oz.)										\rightarrow						\rightarrow	_
Lab Name STOVER Group	Preservatives (Per Container)	Water		-											<u> </u>			-	\dashv
Turn Around Time (TAT)	(Solid	-									-							
Deliverable Type:	ANALY	SES	ΧV	ΧĄ	0 4	٠. ـــ	В	р.	in/ ns	XI sa	-		С	E e	87			\neg	\neg
Account #	REQUES		App.	App.IX BNA	9 %	오怒	PCB	Her	Dioxin/ Furans	App. Met	S	S	T0C	Grain Size	£ 2	٠ ا			
Lab Matrix				\			\			Ir	dicat	е Ме		Num	ρ έλ ζ.	+			\
Sample Client ID/Description Chosen		ollected ite/Time													Leopus Davio		,		
No. MS MSDLI		ite/11iiie													De.				
CO1 H9-SW00049-0-0424	(J) 5/24)	00 1030													λ				
	1-1-1	. ,																	
									i										
Special Instructions:	Matrix Cod	es Date	/Revis	ions:									LAB	USE (NLY				
	S - Soil SD - Sediment	1						[Samp	les we	re:				COC	Tape	was:		
55-gallons of louter from	SO - Solid SL - Sludge	-							1) Shi	ipped _	ivered_		_ or				Outer (N)	Packag	ge
55-gallons of wheter from Muddy Pond	W - Water O - Oil	2. —							Air	na Den bill#_	verea _				-	•	on Out	er Daci	kana
11/wday rord	A - Air DS - Drum Soli	ids —						—			ure Bla						(N)	ci raci	kage
CTT 1/D	DL - Drum Liq L - EP/TCLP I	uids 5.—					•			mp	or Dia	°	°C				Sampl	e	
SITEYO	WP - Wipes X - Other							—			in Goo	d Cond	lition				(N)		
	F - Fish								-) or bels In	(N) licate F	Properly	u Drace	rved			on San	npie	
L L L Date Time	elinquished	Received	ı	Date	Ti	me) or		Toperty	y Fiese	A YEU	coc	Record	Presen	t Upor	, j
by by	by	by	+		+	-					Within	Holdir	ng Tim	es	Samn	e Rece	ption?		
\$ 100 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			\perp		 				-) or					NOTE		(14)		
\$ Dulid show 5/3000 14/05							_	,			s Betw		inples		NOIE	5 .			
)	$ \cdot $) or									
980-2128			+		1	\neg	Page L	of _											
8																			

Tissue Samples

Chain-of-Custody Documentation



Client	t EPA		С	ontact Name		Kelly Spittler				An	alys	is Re	ques	sted	by	Gro	oup b	у С	onta	iner		
	Housatonic River Project			ct Phone No.		610-701-3953						oer liste										
W.O.				around-Time										Pres								\neg
Laboratory		•		Sampler		Woodlot Alt															T	
,		•		•					111													
Lab Batch N	lumber								ICE													
														als								
	Occupate ID	- Matrix	k QC	Total Num of Containers	Matrix	Date Collected	Duplicate Sample	App.IX VOA	Aroclors	Homologs	Congeners	PCB Herbicide	Dioxin/Furan	Appx. IX Metals		Sulfide		n Size				
Lab ID	Sample ID		MOD					dd	Š	lon	ο̈́	PCB Herbi	ļõ	dd	CN	JE I	TOC	Grain				
		MS	MSD					⋖	۹		0	<u>т</u> Т		۹	0	0)	_	0		+	$+\!-$	₩
	H3TA08RP34-0-EM01	Х	Х	1	TI	22-May-00		<u> </u>	1			Х	-						-+	+	+	\vdash
	H3TA08RP35-0-TP01			1	TI	8-May-00						X								+	+	T
	H3TA10RP36-0-EM02			1	TI	8-May-00						X								_	\top	T
	H3TA10RP37-0-TP01			1	TI	9-May-00						X								+	†	t
	H3TA12RP39-0-EM01			1	TI	23-May-00						Х									1	T
						,															1	
																					Ī	
																L			\perp	丄	丄	\bot
	rks/Comments			Lab Use On	ly							Tape						_	Υ	Ν		
Larvae to Me	etamorph, Rana pipiens									С	OC 1	ape w	as unb	roke	n on	oute	r pack	age	Υ	١	1	
												СО	СТар	e was	pres	sent	on sa	mple	Υ	Ν		
	for analysis are samples of	lated		Temp of Coo	ler whe	n Received, C)					COC	Tape	was เ	ınbro	ken	on sa	mple	Υ	Ν		
5/18/00 to 5/				·									-				d cond	-		Ν		
	rity for analysis are sample	es date	ed	1	2	3	4					Lab	els Ind							Ν		
from 6/00 to							· · · · · · · · · · · · · · · · · · ·						Rece	eived	withi	n Ho	Iding	Time	Υ	Ν	i	
Third priority 1/00 to 5/15/	of for analysis are samples of for	dated	from	Relinquishe	ed by	Received by	Date			Time		Relino	uishe	d by	Red	ceive	d by	I	Date		Time	е
											_				_					+		
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										Pag	е	1 о	f 1	1								



Clien	t EPA		С	ontact Name		Kelly Spittler				An	alys	sis R	equ	uest	ted	by	Gro	up l	оу С	ont	aine	r		
	Housatonic River Project		Conta	ct Phone No.		610-701-3953					-	ber lis	_			-		-	-					
W.O		•	Turn-	around-Time										F	rese	erva	tive							
Laboratory	GERG	_		Sampler		Woodlot Alt																		
									ш															
Lab Batch N	Number								ICE															
<u> </u>				1		1									als									
Lab ID	Sample ID	- Matrix	c QC	Total Num of Containers	Matrix	Date Collected	Duplicate Sample	App.IX VOA	Aroclors	Homologs	Congeners	<u>а</u>	Herbicide	Dioxin/Furan	Appx. IX Metals		Sulfide	O	in Size					
		MS	MSD					App	Aro	오	Ō	PCB	훈	Dio I	Api	$\frac{S}{S}$	Sul	TOC	Grain					
	R1-F001-00-C1			1	TI	28-Apr-00		È	Ì			X	_	_				Ė	Ť			+	十	\dashv
	R1-F001-00-C2			1	TI	28-Apr-00						Х	1									十	寸	\neg
	R1-F001-33-E1			1	TI	28-Apr-00						Х								П		丁	丁	\neg
	R4-EM01-00-C1			1	TI	13-Nov-00						Х												
	R4-EM01-40-E1			1	TI	13-Nov-00						Х												
	R4-EM01-40-S1			1	TI	13-Nov-00						Х												
																							_	
																							4	
																							ㅗ	
	rks/Comments			Lab Use Onl	y							СТар		-				-	_	Υ		N		
Crossover L	arvae, Rana pipiens									C	COC	Tape	was	unbr	oken	on	oute	r pack	cage	Υ		N		
												C	OC 1	Гаре	was	pres	sent	on sa	mple	Υ		N		
	for analysis are samples d	lated		Temp of Coo	ler whe	n Received, C ^o)					CO	СТа	pe w	as u	nbro	ken	on sa	mple	Υ		N		
5/18/00 to 5				·										Rec	eive	d in	good	d cond	dition	Υ		N		
	rity for analysis are sample	es date	ed	1	2	3	4					La	bels					Prese				N		
from 6/00 to													R	eceiv	ved v	vithir	n Ho	lding	Time	Υ		N		
1/00 to 5/15	y for analysis are samples o /00	dated	trom	Relinquishe	ed by	Received by	Date		_	Time		Reli	nquis	shed	by	Rec	ceive	d by		Date		Т	ime	
																					_			
										_		_	_											
										Pag	le	1	of	1										



Client	EPA		С	ontact Name		Kelly Spittler				An	alys	is Re	ques	sted	by	Gro	up k	оу С	onta	ainer		
Site Name	Housatonic River Project	C	Conta	ct Phone No.		610-701-3953					(numb	er liste	d for to	otal c	ontai	ners	per an	alysis	s grou	(qı		
W.O.		•	Turn-	around-Time										Pres	erva	tive						
Laboratory	GERG			Sampler		Woodlot Alt																
									ш										1 1			ļ
Lab Batch N	umber								ICE													
														SE					1 1			
		Matrix	c QC	Total Num of Containers	Matrix	Date Collected	Duplicate Sample	App.IX VOA	Aroclors	Homologs	Congeners	PCB Herbicide	Dioxin/Furan	Appx. IX Metals		Sulfide	4.5	n Size				
Lab ID	Sample ID							dd	roc	lor	uo	Herb.	Į.Š	βď	CN	ulfi	TOC	Grain				
10.055	110T) (40DD07 0 F00F	MS	MSD	1	TI	40 May 00		⋖	⋖					۷	O	S	_	Э	₩	+	+	_
10.255g	H3TV10RP37-0-F005	.,	.,	1 1	TI TI	10-May-00	Х					X X	+						\vdash	+	+	+
43.36g	H3TV04RP32-0-F003 H3TV04RP32-0-F006	Х	Х	1	TI	1-May-00 1-May-00						<u>^ </u>	-	-					₩	+	+	+
14.747g 70.57g	H3TV08RP34-0-F005			1	TI	3-Apr-00						<u>^ </u>	+						╁	+	+	+
49.37g	H3TV08RP34-0-F006			1	TI	3-Apr-00						<u>^ </u>	+						₩	+	+	+
60.24g	H3TV08RP35-0-F003			1	TI	2-May-00						<u>^</u>	+						₩	+	+	+
12.789g	H3TV10RP37-0-F009			1	TI	5-May-00						<u>^</u>	+						₩	+	+	+
76.56g	H3TV12RP39-0-F001			1	TI	3-May-00						X							一十	+	十	+
51.32g	H3TV12RP39-0-F008			1	TI	4-May-00						X	+						\vdash	+	+	+
21.131g	R1-F001(Ovary)			1	TI	28-Apr-00						X	+						H	+	+	+-
28.539g	R1-F006(Ovary)			1	TI	28-Apr-00						X	1						\vdash	\dashv	+	_
21.03g	R2-F009(Ovary)			1	TI	26-Apr-00						X	1						\vdash	\dashv	+	_
17.566g	R2-F012(Ovary)			1	TI	26-Apr-00						X							H		\top	
20.437g	R3-F001(Ovary)			1	TI	18-May-00						X							H	\neg	+	
	` 3/					,														\neg	\top	
Field Remar	rks/Comments			Lab Use Onl	y						COC	Tape	vas pi	resen	t on	outer	pack	kage	Υ		N	
Egg Mass/Ov	vary, Rana pipiens				•							ape wa							Υ		N	
												CO	СТар	2 14/26	nro	ent (on ca	mnla	~		N	
First priority f	for analysis are samples d	ated		Tomp of Coo	lor who	n Received, C ^o)						•		•			•				
5/18/00 to 5/3				Temp or Coo	T WITE	li Received, C						COC									N	
Second prior	ity for analysis are sample	s date	ed	1	2	3	4					Lahe	ls Indi			_	l cond				N N	
from 6/00 to	12/00			'								Labe					lding				N	
Third priority	for analysis are samples of	dated t	from	Polinguich	nd by	Descional to	Dota		Ι.	Timo	T	Dolina			1					Т		
1/00 to 5/15/0	00			Relinquishe	u by	Received by	Date			Time		Reling	uisne	u by	Rec	eive	d by		Date	$\perp \!\!\! \perp$	Tir	iie
																				\dashv		
																				$\perp \perp$		
										Pag	e 1	l of	2)								



Client	EPA		С	ontact Name		Kelly Spittler				An	alys	is Re	ques	sted	by	Gro	up k	у С	ontai	ner		
Site Name	Housatonic River Project	(Conta	ct Phone No.		610-701-3953				((numl	er liste	for to	otal c	ontaiı	ners p	er an	alysis	group)		
W.O.		'	Turn-	around-Time										Pres	erva	tive						
Laboratory	GERG			Sampler		Woodlot Alt																
									ICE													
Lab Batch N	umber								2													
														S								
		Matrix	c QC	Total Num of Containers	Matrix	Date Collected	Duplicate Sample	X VOA	ors	Homologs	Congeners	PCB Herbicide	Dioxin/Furan	. IX Metal	CN	е		Size				
Lab ID	Sample ID			Containers			Sample	App.IX	Aroclors	omc	buc	PCB Herbi	OXi	ď	_	nlfid	TOC	Grain				
		MS	MSD					₹	Ā	Ĭ	ŭ		Ö	₹	\Box	S	ĭ	Ō				
17.216g	R3-F002(Ovary)			1	TI	18-May-00						X	_									
19.405g	R3-F003(Ovary)			1	TI	18-May-00						Х	 						_	-		
														-								
														-								
													1	1								
													1									
													1									
													1	1								
														-								
													1	1								
													-	-								
Field Bemar	<u> </u> rks/Comments			Lab Use Onl	<u> </u>						000	Tape			t an		naale	000		N		
Egg Mass, R				Lab Use Oili	У							ape wa							Y Y	N		
Egg Mass, R	aria pipieris									C							·			IN		
Eirot priority	for analysis are samples d	atad										CO	Tap	e was	pres	sent o	on sai	mple	Υ	N		
5/18/00 to 5/		aleu		Temp of Coo	ler whe	n Received, C ^o						COC								N		
	ity for analysis are sample	o data	. d														cond			N		
from 6/00 to		s ualt	t u	1	2	3	4					Labe	ls Ind							N		
	for analysis are samples of	datad	from										Rece	ived	T			Time	Υ	N		
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Client	EPA		С	ontact Name		Kelly Spittler				Ana	alys	sis Re	que	sted	by	Gro	up k	у С	ont	aine	er		
Site Name	Housatonic River Project	(Conta	ct Phone No.		610-701-3953					-	ber list	-		-		-	-					
W.O.			Turn-	around-Time										Pres	erva	tive							
Laboratory	GERG			Sampler		Woodlot Alt																	
							<u>'</u>		Ш														
Lab Batch No	umber								ICE														
														als						S			
		Matrix	c QC	Total Num of	Matrix	Date Collected	Duplicate	App.IX VOA	LS.	sbo	ners	0	Dioxin/Furan	Appx. IX Metals				Size		Pesticides			
Lab ID	Sample ID			Containers	Matrix	Date Collected	Sample	XI.dq	Aroclors	Homologs	Congeners	PCB Herbicide	ioxin/	bbx.	N O	Sulfide	тос	_	РАН	OC Pe			
40.055	110TO 40DD07 0 F00F	MS	MSD	4		40 M 00		⋖	⋖	エ					О	S	_	Э					
10.255g	H3TO10RP37-0-F005 H3TO04RP32-0-F003	Х	Х	1	TI TI	10-May-00 1-May-00					Х	X	Х	Х					Χ	λ		\dashv	
43.36g 14.747g	H3TO04RP32-0-F006			1	TI	1-May-00	x											$\overline{}$					
70.57g	H3TO04RP34-0-F005			1	TI	3-Apr-00	^				<u>^</u>	X	X						X				
49.37g	H3TO08RP34-0-F006			1	TI	3-Apr-00					^	X	+^	+^					^	^			
60.24g	H3TO08RP35-0-F003			1	TI	2-May-00						X											
12.789g	H3TO10RP37-0-F009			1	TI	5-May-00					Х	X	X	Х					Х	Х			
76.56g	H3TO12RP39-0-F001			1	TI	3-May-00					X	X	X						X	Х			
17.68g	H3TO12RP39-0-F008			1	TI	4-May-00						X	1	 						Ť			
	R1-F001(Offal)	Х	Х	1	TI	28-Apr-00						Х											
	R1-F006(Offal)			1	TI	28-Apr-00					Х	Х	Х	Х					Χ	Χ			
	R2-F009(Offal)			1	TI	26-Apr-00					Х	Х	Х						Χ	Χ			
	R2-F012(Offal)			1	TI	26-Apr-00						Х											
	R3-F001(Offal)			1	TI	18-May-00						Х											
Field Remar	ks/Comments			Lab Use Onl	у						COC	С Таре	was p	reser	nt on	oute	r pack	age	Υ		Ν		
	Adult Females without ov	ary, F	Rana							С	C.	Tape w	as unl	oroke	n on	oute	r pack	age	Υ		Ν		
pipiens												СО	С Тар	e was	s pre	sent	on sa	mple	Υ		N		
Lab to create				Temp of Coo	ler whe	n Received, C ^o											on sa				N		
First priority for	or analysis are samples d	ated											-				conc				N		
5/18/00 to 5/3				1	2	3	4					Lab					Prese				N		
	ity for analysis are sample	s date	ed														lding ⁻				Ν		
from 6/00 to	12/00 for analysis are samples o	dated	from	Relinquishe	d by	Received by	Date			Time		Relin			T	ceive			Date			Гіте	
1/00 to 5/15/0	•	Jaicu	0,11								1												$\overline{}$
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Client E		,		ontact Name ct Phone No.		Kelly Spittler 610-701-3953						is Rober list									r		
W.O.	lousatonic River Project			ct Phone No. around-Time	,	610-701-3953					(numi	oer list	a tor		erva	_	er an	aiysis	grou	ip)			_
Laboratory G	BERG		ı uı ıı-	Sampler	i	Woodlot Alt					Ī		1	1163	l	live		Ī					_
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Lab Batch Nui	mber								ICE														
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		Matrix	QC	Total Num of			Duplicate	0		gs	ers	9	a	Me				Size		ticio			
Lab ID	Sample ID	Mudia	. 40	Containers	Matrix	Date Collected	Sample	App.IX VOA	Aroclors	Homologs	Congeners	PCB	Dioxin/Furan	Appx. IX Metals		Sulfide	ပ	ain S	$_{\pm}$	Pesticides			
		MS	MSD					App	Aro	ЮH	Ö	PCB	: 	Apr	S	Sul	TOC	Grain	PAH	8			
	R3-F002(Offal)			1	TI	18-May-00						Х											
	R3-F003(Offal)			1	TI	18-May-00					Χ	Х	X	Х					Χ	Х			
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Field Remark	s/Comments			Lab Use Onl	у							Таре							Υ		N		
Experimental A	Adult Females, Rana pipi	iens								С	OC 1	Гаре и	as un	broke	n on	outer	pack	age	Υ		N		
E, .												CC	С Тар	e wa	s pre	sent o	on sar	nple	Υ		Ν		
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	/ for analysis are sample	s date	۱ ۸														cond				Ν		
from 6/00 to 12	•	3 date	,u	1	2	3	4					Lab	els Ind								N N		
	or analysis are samples o	dated	from	Dalinguiaha	al last	B : 1.1	Dete		Ι,	Time o	П	Dalia					ding 7			Т		Time o	
1/00 to 5/15/00				Relinquishe	u by	Received by	Date			Γime		Relin	luisne	u by	Ked	ceive	u by	L	Date			ime	
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Matrix QC Sample ID Sample ID Matrix QC Sample ID Matrix QC Sample ID Matrix Date Collected Sample ID Sample ID Matrix Date Collected Sample ID Sample ID Sample ID Matrix Date Collected Sample ID Sample	Client	: EPA		С	ontact Name		Kelly Spittler				An	alys	is Re	que	sted	by	Gro	oup l	оу С	ont	aine	r	
Lab Batch Number	Site Name	Housatonic River Project	C	onta	ct Phone No.		610-701-3953					(numb	oer liste	d for	total c	ontai	ners	per an	alysis	gro	nb)		
Lab Batch Number	W.O.		•	Turn-	around-Time										Pres	erva	tive						
Name	Laboratory	GERG			Sampler		Woodlot Alt																
Name			•							ш													
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19.125g H3TA03RP31-0-F001	Lab ID	Sample ID	Matrix	QC		Matrix	Date Collected	-	N VOA	clors	ologs	geners	3	kin/Furan	x. IX Meta		ide		in Size				
19.125g H3TA03RP31-0-F001	Lab ID	Sample ID	MS	MSD	1				dd	١٢٥	р	Son	ةِ ا كِيَّ	. <u>.</u>	dd	Z	Jil.	ŏ	Эга	اخ∣	႘		
H3TA04RP32-0-C001	10 125a	H3TA03RP31-0-F001	IVIO	IVIOD	1	TI	10-May-00	X	_	1	_			╁	+	۲	0)			ь.	\dashv	\dashv	+
H3TA04RP33-0-C001	13.1239		Х	Х			-														_	\dashv	_
H3TA08RP34-0-C001							,		X														
H3TA08RP35-0-C001									X														
H3TA10RP36-0-C001																							
H3TA10RP37-0-C001						TI																	
H3TA12RP39-0-C001 6 TI 19-Apr-00 X		H3TA10RP37-0-C001				TI																	
R1-C001		H3TA12RP38-0-C001	Х	Х	4	TI	2-May-00						Х										
R2-C001		H3TA12RP39-0-C001			6	TI	19-Apr-00	Х					Х										
R3-C001 2 TI 18-May-00		R1-C001			4	TI	28-Apr-00						Х										
Field Remarks/Comments Adult Chemical Analysis, Rana pipiens First priority for analysis are samples dated 5/18/00 to 5/30/00 Second priority for analysis are samples dated from 1/00 to 5/15/00 Lab Use Only COC Tape was present on outer package Y N COC Tape was unbroken on outer package Y N COC Tape was unbroken on sample Y N COC Tape was unbroken on sample Y N Received in good condition Y N Received within Holding Time Y N Received within Holding Time Y N Received by Date Time Relinquished by Received by Date Time		R2-C001			4	TI	26-Apr-00						Х										
Adult Chemical Analysis, Rana pipiens First priority for analysis are samples dated 5/18/00 to 5/30/00 Second priority for analysis are samples dated from 6/00 to 12/00 Third priority for analysis are samples dated from 1/00 to 5/15/00 COC Tape was unbroken on outer package Y N COC Tape was unbroken on sample Y N Received in good condition Y N Received within Holding Time Y N Received by Date Time Relinquished by Received by Date Time		R3-C001			2	TI	18-May-00						Х										
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First priority for analysis are samples dated 5/18/00 to 5/30/00 Second priority for analysis are samples dated from 6/00 to 12/00 Third priority for analysis are samples dated from 1/00 to 5/15/00 Temp of Cooler when Received, C° Temp of Cooler when Received, C° Temp of Cooler when Received, C° Received in good condition Y N Received within Holding Time Y N Received within Holding Time Y N Received by Date Time	Adult Chemi	cal Analysis, Rana pipiens	i								С	OC T	ape w	as un	broke	n on	oute	r pack	kage	Υ		N	
5/18/00 to 5/30/00 Second priority for analysis are samples dated from 6/00 to 12/00 Third priority for analysis are samples dated from 1/00 to 5/15/00 Third priority for analysis are samples dated from 1/00 to 5/15/00 Third priority for analysis are samples dated from 1/00 to 5/15/00 Third priority for analysis are samples dated from 1/00 to 5/15/00 Third priority for analysis are samples dated from 1/00 to 5/15/00 Received in good condition Y N Received Y N Received within Holding Time Y N Time 1/00 to 5/15/00													СО	C Tap	e was	s pre	sent	on sa	mple	Υ		N	
Second priority for analysis are samples dated from 6/00 to 12/00 Third priority for analysis are samples dated from 1/00 to 5/15/00 Received in good condition Y N Labels Indicate Properly Preserved Y N Received within Holding Time Y N Received by Date Time Relinquished by Received by Date Time			ated		Temp of Coo	ler whe	n Received. C°)					coc	Tape	was ı	Jnbro	ken	on sa	mple	Υ		N	
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	Lab to create	e duplicate								-		\dashv				1					\dashv		
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Appendix C

Tissue Samples For Organic and Metals (COC) Analyses

Exposure Assessment total PCBs

total PCB Analytical Results For Water & Sediment Samples

Organic & Metals Analytical Results (COCs) For Tissue Samples

Leopard Frog Egg Mass Samples

TA -> TV to uniquely represent ovary of adult LF

											TA -> TV to uniquely represent ovary or addit LF
[Freezer]			Date			Total		Dioxin/		PAH/OC	
Location	Sample ID	Site	collected	Description:	Study	PCBs ¹	PCB Congeners ¹	Furans ¹	Metals ¹	Pesticides ¹	New ID
Bag 1	H3TA03RP31-0-F002	31	2000	Ovary	2000 Leopard Frog Study			not analyzed	- unable to te	ll if sample includ	led ovaries (were not frozen separately
Bag 4	H3TA04RP32-0-F001	32	2000	Ovary	2000 Leopard Frog Study						
Bag 2	H3TA04RP32-0-F003	32	2000	Ovary	2000 Leopard Frog Study	Υ					H3TV04RP32-0-F003
Bag 2	H3TA04RP32-0-F006	32	2000	Ovary	2000 Leopard Frog Study	Υ					H3TV04RP32-0-F006
Bag 4	H3TA04RP32-0-F007	32	2000	Ovary	2000 Leopard Frog Study						
Bag 5	H3TA04RP33-0-F002	33	2000	Ovary	2000 Leopard Frog Study						
Bag 5	H3TA04RP33-0-F004	33	2000	Ovary	2000 Leopard Frog Study						
Bag 5	H3TA04RP33-0-F005	33	2000	Ovary	2000 Leopard Frog Study						
Bag 6	H3TA04RP33-0-F006	33	2000	Ovary	2000 Leopard Frog Study						
Bag 6	H3TA04RP33-0-F008	33	2000	Ovary	2000 Leopard Frog Study						
Bag 8	H3TA08RP34-0-F001	34	2000	Egg Mass (ovary)	2000 Leopard Frog Study						
Bag 8	H3TA08RP34-0-F002	34	2000	Egg Mass (ovary)	2000 Leopard Frog Study						
Bag 8	H3TA08RP34-0-F003	34	2000	Egg Mass (ovary)	2000 Leopard Frog Study						
Bag 9	H3TA08RP34-0-F005	34	2000	Egg Mass (ovary)	2000 Leopard Frog Study	Υ					H3TV08RP34-0-F005
Bag 9	H3TA08RP34-0-F006	34	2000	Egg Mass (ovary)	2000 Leopard Frog Study	Υ					H3TV08RP34-0-F006
				_							
Bag 10	H3TA08RP35-0-F001	35	2000	Ovary	2000 Leopard Frog Study						
Bag 10	H3TA08RP35-0-F002	35	2000	Ovary	2000 Leopard Frog Study						
Bag 10	H3TA08RP35-0-F003	35	2000	Ovary	2000 Leopard Frog Study	Υ					H3TV08RP35-0-F003
Bag 11	H3TA08RP35-0-F004	35	2000	Ovary	2000 Leopard Frog Study						
Bag 11	H3TA08RP35-0-F005	35	2000	Ovary	2000 Leopard Frog Study						
Bag 13	H3TA10RP36-0-F001	36	2000	Ovary	2000 Leopard Frog Study						
Bag 17	H3TA10RP37-0-F001	37	2000	Ovary	2000 Leopard Frog Study						
Bag 17	H3TA10RP37-0-F002	37	2000	Ovary	2000 Leopard Frog Study						
Bag 15	H3TA10RP37-0-F003	37	2000	Ovary	2000 Leopard Frog Study						
Bag 15	H3TA10RP37-0-F004	37	2000	Ovary	2000 Leopard Frog Study						
Bag 15	H3TA10RP37-0-F005	37	2000	Ovary	2000 Leopard Frog Study	Υ					H3TV10RP37-0-F005
Bag 15	H3TA10RP37-0-F009	37	2000	Ovary	2000 Leopard Frog Study	Ý					H3TV10RP37-0-F009
Day 13	1101A10NF31-0-F009	31	2000	Ovary	2000 Leopard Frog Study						1131 4 1017E31-0-E008

¹Tissue samples selected for organic and metals analyses by EVS Environment Consultants.

Leopard Frog Egg Mass Samples

TA -> TV to uniquely represent ovary of adult LF

											TA -> TV to uniquely represent ovary of adult LF
[Freezer]			Date			Total		Dioxin/		PAH/OC	_
Location	Sample ID	Site	collected	Description:	Study	PCBs ¹	PCB Congeners ¹	Furans ¹	Metals ¹	Pesticides ¹	_New ID
Bag 19	H3TA12RP38-0-F001	38	2000	Ovary	2000 Leopard Frog Study						
Bag 19	H3TA12RP38-0-F002	38	2000	Ovary	2000 Leopard Frog Study						
Bag 19	H3TA12RP38-0-F004	38	2000	Ovary	2000 Leopard Frog Study						
Bag 19	H3TA12RP38-0-F007	38	2000	Ovary	2000 Leopard Frog Study						
Bag 22	H3TA12RP39-0-F001	39	2000	Ovary	2000 Leopard Frog Study	Υ					H3TV12RP39-0-F001
Bag 22	H3TA12RP39-0-F002	39	2000	Ovary	2000 Leopard Frog Study						
Bag 23	H3TA12RP39-0-F006	39	2000	Ovary	2000 Leopard Frog Study						
Bag 23	H3TA12RP39-0-F007	39	2000	Ovary	2000 Leopard Frog Study						
Bag 23	H3TA12RP39-0-F008	39	2000	Ovary	2000 Leopard Frog Study	Υ					H3TV12RP39-0-F008
Bag 23	H3TA12RP39-0-F009	39	2000	Ovary	2000 Leopard Frog Study						
Bag 23	H3TA12RP39-0-F010	39	2000	Ovary	2000 Leopard Frog Study						
Bag 26	R1-F001	R1	2000	Ovary	2000 Leopard Frog Study	Υ					R1-F001(Ovary)
Bag 26	R1-F001	R1	2000	Ovary	2000 Leopard Frog Study						
Bag 26	R1-F001	R1	2000	Ovary	2000 Leopard Frog Study						
Bag 26	R1-F003	R1	2000	Ovary	2000 Leopard Frog Study						
Bag 27	R1-F005	R1	2000	Ovary	2000 Leopard Frog Study						
Bag 27	R1-F005	R1	2000	Ovary	2000 Leopard Frog Study						
Bag 27	R1-F005	R1	2000	Ovary	2000 Leopard Frog Study						
Bag 27	R1-F006	R1	2000	Ovary	2000 Leopard Frog Study	Υ					R1-F006(Ovary)
Bag 30	R2-F009	R2	2000	Ovary	2000 Leopard Frog Study	Υ					R2-F009(Ovary)
Bag 30	R2-F010	R2	2000	Ovary	2000 Leopard Frog Study						
Bag 28	R2-F011	R2	2000	Ovary	2000 Leopard Frog Study						
Bag 28	R2-F011	R2	2000	Ovary	2000 Leopard Frog Study						
Bag 28	R2-F012	R2	2000	Ovary	2000 Leopard Frog Study						
Bag 28	R2-F012	R2	2000	Ovary	2000 Leopard Frog Study	Υ					R2-F012(Ovary)
Bag 31	R3-F001	R3	2000	Ovary	2000 Leopard Frog Study	Υ					R3-F001(Ovary)
Bag 31	R3-F002	R3	2000	Ovary	2000 Leopard Frog Study	Υ					R3-F002(Ovary)
Bag 31	R3-F002	R3	2000	Ovary	2000 Leopard Frog Study						
Bag 31	R3-F003	R3	2000	Ovary	2000 Leopard Frog Study	Υ					R3-F003(Ovary)
Bag 33	R3-F005	R3	2000	Ovary	2000 Leopard Frog Study						
Bag 33	R3-F006	R3	2000	Ovary	2000 Leopard Frog Study						
Bag 33	R3-F006	R3	2000	Ovary	2000 Leopard Frog Study						

¹Tissue samples selected for organic and metals analyses by EVS Environment Consultants.

Leopard Frog Larvae to Metamorph Samples

[Freezer]				Date		Total	=
Location	Site	Sample ID	Description:	collected	Study	PCBs ¹	
Bag 35	33	H3TA04RP33-0-EM01	Dead Larvae	2000	2000 Leopard Frog Study		Not analyzed - only *one* larvae in jar
Bag 36	34	H3TA08RP34-0-EM01	Hatched Embryos 4/18	2000	2000 Leopard Frog Study		
Bag 36	34	H3TA08RP34-0-EM01	Hatched Embryos 5/22	2000	2000 Leopard Frog Study	Y	
Bag 37	35	H3TA08RP35-0-TP01	Tadpoles 5/8	2000	2000 Leopard Frog Study	Υ	
Bag 38	36	H3TA10RP36-0-EM01	Hatched Larvae	2000	2000 Leopard Frog Study		
Bag 38	36	H3TA10RP36-0-EM01	Metamorph (T4 Exposed)	2000	2000 Leopard Frog Study		
Bag 38	36	H3TA10RP36-0-EM01	Tadpoles	2000	2000 Leopard Frog Study		
Bag 38	36	H3TA10RP36-0-EM01	Tadpoles (T4 Exposed)	2000	2000 Leopard Frog Study		
Bag 38	36	H3TA10RP36-0-EM02	Hatched Embryos	2000	2000 Leopard Frog Study		
Bag 38	36	H3TA10RP36-0-EM02	Tadpoles 4/13	2000	2000 Leopard Frog Study	Y	
Bag 39	37	H3TA10RP37-0-TP01	Tadpoles	2000	2000 Leopard Frog Study	Υ	
Bag 39	37	H3TA10RP37-0-TP01	T1Tadpoles 5/9/00	2000	2000 Leopard Frog Study		
Bag 40	39	H3TA12RP39-0-EM01	Hatched Embryos	2000	2000 Leopard Frog Study		
Bag 40	39	H3TA12RP39-0-EM01	Tadpoles 5/23	2000	2000 Leopard Frog Study	Υ	

2000

¹Tissue samples selected for organic and metals analyses by EVS Environment Consultants.

Leopard Frog Adult "Experimental" Samples

TA -> TO to uniquely represent offal portion of adult LF

											IA -> 10 to uniquely represent offal portion of adult LF
[Freezer]	Cample ID	Cito	Date	Decemention	Chindre	Total PCBs ¹	PCB	Dioxin/ Furans ¹	Metaled	PAH/OC	New ID
Location	Sample ID	Site	collected	Description:	Study	PCBS	Congeners ¹	Furans	Metals1	Pesticides ¹	New ID
Bag 1	H3TA03RP31-0-F002	31	2000	Body,Liver	2000 Leopard Frog Study		not analyzed - ova	ries were not f	rozen separatel	y, unable to tell if	body and ovaries separate in sample jar
D	LIOTA O ADDOO O FOOA	00	0000	D. J. H.	000011501.1						
Bag 4	H3TA04RP32-0-F001	32	2000	Body,Liver	2000 Leopard Frog Study	.,					LIOTO APPOS A FORM
Bag 2	H3TA04RP32-0-F003	32	2000	Body,Liver	2000 Leopard Frog Study	Y	.,	.,			H3TO04RP32-0-F003
Bag 2	H3TA04RP32-0-F006	32	2000	Body,Liver	2000 Leopard Frog Study	Υ	Υ	Υ	Υ	Υ	H3TO04RP32-0-F006
Bag 4	H3TA04RP32-0-F007	32	2000	Body,Liver	2000 Leopard Frog Study						
Bag 5	H3TA04RP33-0-F002	33	2000	Body,Liver	2000 Leopard Frog Study						
Bag 5	H3TA04RP33-0-F004	33	2000	Body,Liver	2000 Leopard Frog Study						
Bag 5	H3TA04RP33-0-F005	33	2000	Body,Liver	2000 Leopard Frog Study						
Bag 6	H3TA04RP33-0-F006	33	2000	Body,Liver	2000 Leopard Frog Study						
Bag 6	H3TA04RP33-0-F008	33	2000	Body,Liver	2000 Leopard Frog Study						
Bag 8	H3TA08RP34-0-F001	34	2000	Body,Liver	2000 Leopard Frog Study						
Bag 8	H3TA08RP34-0-F002	34	2000	Body,Liver	2000 Leopard Frog Study						
Bag 8	H3TA08RP34-0-F003	34	2000	Body,Liver	2000 Leopard Frog Study						
Bag 9	H3TA08RP34-0-F005	34	2000	Body,Liver	2000 Leopard Frog Study	Υ	Υ	Υ	Υ	Υ	H3TO08RP34-0-F005
Bag 9	H3TA08RP34-0-F006	34	2000	Body,Liver	2000 Leopard Frog Study	Ϋ́		•		•	H3TO08RP34-0-F006
Dag 0	11017100111 04 01 000	0-1	2000	Body, Liver	2000 Ecopara i Tog Ciday	•					1101000111 04 01 000
Bag 10	H3TA08RP35-0-F001	35	2000	Body,Liver	2000 Leopard Frog Study						
Bag 10	H3TA08RP35-0-F002	35	2000	Body,Liver	2000 Leopard Frog Study						
Bag 10	H3TA08RP35-0-F003	35	2000	Body,Liver	2000 Leopard Frog Study	Υ					H3TO08RP35-0-F003
Bag 11	H3TA08RP35-0-F004	35	2000	Body,Liver	2000 Leopard Frog Study						
Bag 11	H3TA08RP35-0-F005	35	2000	Body,Liver	2000 Leopard Frog Study						
Bag 13	H3TA10RP36-0-F001	36	2000	Body,Liver	2000 Leopard Frog Study						
Bag 13	H3TA10RP36-0-F002	36	2000	Body,Liver	2000 Leopard Frog Study						
•				•	, , ,						
Bag 17	H3TA10RP37-0-F001	37	2000	Body,Liver	2000 Leopard Frog Study						
Bag 17	H3TA10RP37-0-F002	37	2000	Body,Liver	2000 Leopard Frog Study						
Bag 15	H3TA10RP37-0-F003	37	2000	Body,Liver	2000 Leopard Frog Study						
Bag 15	H3TA10RP37-0-F004	37	2000	Body,Liver	2000 Leopard Frog Study						
Bag 15	H3TA10RP37-0-F005	37	2000	Body,Liver	2000 Leopard Frog Study	Υ	Υ	Υ	Υ	Υ	H3TO10RP37-0-F005
Bag 15	H3TA10RP37-0-F009	37	2000	Body,Liver	2000 Leopard Frog Study	Υ	Υ	Υ	Υ	Υ	H3TO10RP37-0-F009
Bag 19	H3TA12RP38-0-F001	38	2000	Body,Liver	2000 Leopard Frog Study						
Bag 19	H3TA12RP38-0-F002	38	2000	Body,Liver	2000 Leopard Frog Study						
Bag 19	H3TA12RP38-0-F004	38	2000	Body,Liver	2000 Leopard Frog Study						
Bag 19	H3TA12RP38-0-F004	38	2000	Body,Liver	2000 Leopard Frog Study						
Day 19	131A12KP30-U-FUU/	30	2000	bouy,Livei	2000 Leopard Frog Study						

¹Tissue samples selected for organic and metals analyses by EVS Environment Consultants.

Leopard Frog Adult "Experimental" Samples

TA -> TO to uniquely represent offal portion of adult LF

											- 1A -> 10 to uniquely represent onal portion of addit LF
[Freezer]			Date			Total	PCB	Dioxin/		PAH/OC	
Location	Sample ID	Site	collected	Description:	Study	PCBs ¹	Congeners ¹	Furans ¹	Metals1	Pesticides ¹	New ID
Bag 22	H3TA12RP39-0-F001	39	2000	Body,Liver	2000 Leopard Frog Study	Υ	Υ	Υ	Υ	Υ	H3TO12RP39-0-F001
Bag 22	H3TA12RP39-0-F002	39	2000	Body,Liver	2000 Leopard Frog Study						
Bag 23	H3TA12RP39-0-F006	39	2000	Body,Liver	2000 Leopard Frog Study						
Bag 23	H3TA12RP39-0-F007	39	2000	Body,Liver	2000 Leopard Frog Study						
Bag 23	H3TA12RP39-0-F008	39	2000	Body,Liver	2000 Leopard Frog Study	Υ					H3TO12RP39-0-F008
Bag 23	H3TA12RP39-0-F009	39	2000	Body,Liver	2000 Leopard Frog Study						
Bag 23	H3TA12RP39-0-F010	39	2000	Body,Liver	2000 Leopard Frog Study						
Bag 26	R1-F001	R1	2000	Body,Liver	2000 Leopard Frog Study	Υ					R1-F001(Offal)
Bag 26	R1-F003	R1	2000	Body,Liver	2000 Leopard Frog Study						
Bag 27	R1-F005	R1	2000	Body,Liver	2000 Leopard Frog Study						
Bag 27	R1-F006	R1	2000	Body,Liver,Ovary	2000 Leopard Frog Study	Υ	Υ	Υ	Υ	Υ	R1-F006(Offal)
Bag 30	R2-F009	R2	2000	Body,Liver	2000 Leopard Frog Study	Υ	Υ	Υ	Υ	Υ	R2-F009(Offal)
Bag 30	R2-F010	R2	2000	Body,Liver	2000 Leopard Frog Study						
Bag 28	R2-F011	R2	2000	Body,Liver	2000 Leopard Frog Study						
Bag 28	R2-F012	R2	2000	Body,Liver	2000 Leopard Frog Study	Υ					R2-F012(Offal)
•				•	, , ,						
Bag 31	R3-F001	R3	2000	Body,Liver	2000 Leopard Frog Study	Υ					R3-F001(Offal)
Bag 31	R3-F002	R3	2000	Body,Liver	2000 Leopard Frog Study	Υ	Υ	Υ	Υ	Υ	R3-F002(Offal)
Bag 31	R3-F003	R3	2000	Body,Liver	2000 Leopard Frog Study	Υ					R3-F003(Offal)
Bag 33	R3-F005	R3	2000	Body,Liver	2000 Leopard Frog Study						• ,
Bag 33	R3-F006	R3	2000	Body,Liver	2000 Leopard Frog Study						
•				**	, , ,						

¹Tissue samples selected for organic and metals analyses by EVS Environment Consultants.

Adult Leopard Frog Samples for Chemical Analysis

[Freezer] Location	Sample ID	Site	Date collected	Description:	Study	Total PCBs ¹	Composite ID
Bag 1	H3TA03RP31-0-F001	31	2000	Analytical	2000 Leopard Frog Study	Y	H3TA03RP31-0-C001
Бау і	H31AU3KF31-U-FUU1	31	2000	Analytical	2000 Leopard Flog Study	ı	1131A03KF31-0-C001
Bag 2	H3TA04RP32-0-F002	32	2000	Analytical	2000 Leopard Frog Study	Υ	H3TA04RP32-0-C001
Bag 2	H3TA04RP32-0-F005	32	2000	Analytical	2000 Leopard Frog Study		
Bag 4	H3TA04RP32-0-M005	32	2000	Analytical	2000 Leopard Frog Study		
Bag 4	H3TA04RP32-0-M006	32	2000	Analytical	2000 Leopard Frog Study		
Bag 5	H3TA04RP33-0-F003	33	2000	Analytical	2000 Leopard Frog Study	Y	H3TA04RP33-0-C001
Bag 5	H3TA04RP33-0-F007	33	2000	Analytical	2000 Leopard Frog Study		
Bag 6	H3TA04RP33-0-M003	33	2000	Analytical	2000 Leopard Frog Study		
Bag 6	H3TA04RP33-0-M004	33	2000	Analytical	2000 Leopard Frog Study		
Bag 8	H3TA08RP34-0-F004	34	2000	Analytical	2000 Leopard Frog Study	Y	H3TA08RP34-0-C001
Bag 8	H3TA08RP34-0-F007	34	2000	Analytical	2000 Leopard Frog Study		
Bag 10	H3TA08RP35-0-F006	35	2000	Analytical	2000 Leopard Frog Study	Y	H3TA08RP35-0-C001
Bag 10	H3TA08RP35-0-F007	35	2000	Analytical	2000 Leopard Frog Study	'	11017100111 00 0 0001
Bag 11	H3TA08RP35-0-M005	35	2000	Analytical	2000 Leopard Frog Study		
Bag 11	H3TA08RP35-0-M006	35	2000	Analytical	2000 Leopard Frog Study		
Dag II	11017100111 00 0 111000	00	2000	7 inary irodi	2000 Eoopara i rog otaay		
Bag 13	H3TA10RP36-0-F003	36	2000	Analytical	2000 Leopard Frog Study	Υ	H3TA10RP36-0-C001
Bag 13	H3TA10RP36-0-F005	36	2000	Analytical	2000 Leopard Frog Study		
Bag 13	H3TA10RP36-0-M002	36	2000	Analytical	2000 Leopard Frog Study		
Bag 17	H3TA10RP37-0-F007	37	2000	Analytical	2000 Leopard Frog Study	Y	H3TA10RP37-0-C001
Bag 17	H3TA10RP37-0-F008	37	2000	Analytical	2000 Leopard Frog Study		
Bag 16	H3TA10RP37-0-M004	37	2000	Analytical	2000 Leopard Frog Study		
Bag18	H3TA10RP37-0-M006	37	2000	Analytical	2000 Leopard Frog Study		
-			2000	-	•		
Bag 19	H3TA12RP38-0-F003	38	2000	Analytical	2000 Leopard Frog Study	Υ	H3TA12RP38-0-C001
Bag 19	H3TA12RP38-0-F005	38	2000	Analytical	2000 Leopard Frog Study		
Bag 21	H3TA12RP38-0-M005	38	2000	Analytical	2000 Leopard Frog Study		
Bag 21	H3TA12RP38-0-M006	38	2000	Analytical	2000 Leopard Frog Study		
			2000	Analytical	2000 Leopard Frog Study	Υ	H3TA12RP39-0-C001

¹Tissue samples selected for organic and metals analyses by EVS Environment Consultants.

Adult Leopard Frog Samples for Chemical Analysis

[Freezer]			Date			Total	
Location	Sample ID	Site	collected	Description:	Study	PCBs ¹	Composite ID
Bag 22	H3TA12RP39-0-F004	39	2000	Analytical	2000 Leopard Frog Study		
Bag 22	H3TA12RP39-0-F005	39	2000	Analytical	2000 Leopard Frog Study		
Bag 24	H3TA12RP39-0-M001	39	2000	Analytical	2000 Leopard Frog Study		
Bag 24	H3TA12RP39-0-M005	39	2000	Analytical	2000 Leopard Frog Study		
Bag 24	H3TA12RP39-0-M007	39	2000	Analytical	2000 Leopard Frog Study		
Bag 26	R1-F002	R1	2000	Analytical	2000 Leopard Frog Study	Υ	R1-C001
Bag 27	R1-F004	R1	2000	Analytical	2000 Leopard Frog Study		
Bag 25	R1-M002	R1	2000	Analytical	2000 Leopard Frog Study		
Bag 25	R1-M003	R1	2000	Analytical	2000 Leopard Frog Study		
Bag 30	R2-F007	R2	2000	Analytical	2000 Leopard Frog Study	Υ	R2-C001
Bag 30	R2-F008	R2	2000	Analytical	2000 Leopard Frog Study		
Bag 29	R2-M007	R2	2000	Analytical	2000 Leopard Frog Study		
Bag 29	R2-M008	R2	2000	Analytical	2000 Leopard Frog Study		
Bag 33	R3-F004	R3	2000	Analytical	2000 Leopard Frog Study	Υ	R3-C001
Bag32	R3-M004	R3	2000	Analytical	2000 Leopard Frog Study		

¹Tissue samples selected for organic and metals analyses by EVS Environment Consultants.

Leopard Frog Crossover Larvae Samples

FEL Lab	RP	Weston	FEL Lab	Sample	Total	new
Location	Site	Sample I.D. No.	No.	Description	PCBs ¹	ID
Bag 41	R1		R1-F001	Hatched Embryos	Υ	R1-F001-00-C1
	R1		R1-F001	Hatched Embryos	Υ	R1-F001-00-C2
	R1	Crossover Study	R1-F001	Hatched Embryos Raised in Site 33 Water	Υ	R1-F001-33-E1
Bag 42	R4	Spike Study	R4-Egg Mass	FETAX Water/Sand Exposed	Υ	R4-EM01-00-C1
	R4	Spike Study	R4-Egg Mass	Site 40 Water/Sediment Exposed	Υ	R4-EM01-40-E1
	R4	Spike Study	R4-Egg Mass	Site 40 Water/Sed. Spiked w/ 30 mg/kg Aro 1260	Υ	R4-EM01-40-S1

2000

¹Tissue samples selected for organic and metals analyses by EVS Environment Consultants.

Exposure Assessment total PCBs

HOUSATONIC RIVER PROJECT RANA pipiens 2000 STUDY EXPOSURE ASSESSMENT FOR WATER PCB VALUES¹

2000 LEOPARD FROG REPRODUCTION STUDY

		Total PCB (μg/L)
Vernal pool ID	Water sample ID	
E-5	H3-SW000027-0-0M30	0.043
W-9a	H3-SW000030-0-0M30	0.013
W-8	H3-SW000029-0-0M30	0.14
DUP.	H3-SW000029-1-0M30	0.036
W-7a	H3-SW000028-0-0M30	0.03
W-6	H3-SW000032-0-0M30	0.22
W-4	H3-SW000031-0-0M30	0.013
EW-3	H3-SW000034-0-0M30	0.41
E-1	H3-SW000035-0-0M30	0.24
W-1	H3-SW000033-0-0M30	0.013
MP REF.	H9-SW000049-0-0Y24	0.013

¹Based on work done by EVS Environment Consultants.

HOUSATONIC RIVER PROJECT RANA pipiens 2000 STUDY EXPOSURE ASSESSMENT FOR SEDIMENT PCB VALUES¹

2000 LEOPARD FROG REPRODUCTION STUDY

		Total PCB (mg/kg)
Vernal pool ID	Sediment sample ID	
E-5	H3-SE001246-0-0000	37.0
W-9a	H3-SE001249-0-0000	4.3
W-8	H3-SE001248-0-0000	120.0
W-7a	H3-SE001247-0-0000	18.0
W-6	H3-SE001251-0-0000	42.0
W-4	H3-SE001250-0-0000	0.46
EW-3	H3-SE001253-0-0000	30.0
E-1	H3-SE001245-0-0000	160.0
W-1	H3-SE001252-0-0000	0.15
MP REF.	H9-SE001279-0-0000	0.04

¹Based on work done by EVS Environment Consultants.

total PCB Analytical Results for Water and Sediment Samples

Appendix C

Rana pipiens Developmental Study 2000 PCB Test Results Water Samples

Site ID					
Location ID	SW000027	SW000028	SW000029	SW000029	SW000030
Field Sample ID	H3-SW000027-0-0M30	H3-SW000028-0-0M30	H3-SW000029-0-0M30	H3-SW000029-1-0M30	H3-SW000030-0-0M30
Date Collected	03/30/2000	03/30/2000	03/30/2000	03/30/2000	03/30/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE
Analyte					
PCBS					
AROCLOR-1016 (ug/l)	0.013 UJ	0.013 UJ	0.026 U	0.013 UJ	0.013 R
AROCLOR-1221 (ug/l)	0.013 UJ	0.013 UJ	0.026 U	0.013 UJ	0.013 R
AROCLOR-1232 (ug/l)	0.013 UJ	0.013 UJ	0.026 U	0.013 UJ	0.013 R
AROCLOR-1242 (ug/l)	0.013 UJ	0.013 UJ	0.026 U	0.013 UJ	0.013 R
AROCLOR-1248 (ug/l)	0.013 UJ	0.013 UJ	0.026 U	0.013 UJ	0.013 R
AROCLOR-1254 (ug/l)	0.015 J	0.013 UJ	0.029	0.016 J	0.013 R
AROCLOR-1260 (ug/l)	0.028 J	0.030 J	0.11 J	0.020 J	0.013 R
PCB, TOTAL (ug/l)	0.043 J	0.030 J	0.14 J	0.036 J	0.0013 R

Result Suffix Symbols:

Appendix C

Rana pipiens Developmental Study 2000 PCB Test Results Water Samples

Site ID					
Location ID	SW000031	SW000032	SW000033	SW000034	SW000035
Field Sample ID	H3-SW000031-0-0M30	H3-SW000032-0-0M30	H3-SW000033-0-0M30	H3-SW000034-0-0M30	H3-SW000035-0-0M30
Date Collected	03/30/2000	03/30/2000	03/30/2000	03/30/2000	03/30/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE
Analyte					
PCBS					
AROCLOR-1016 (ug/l)	0.013 U	0.026 U	0.013 UJ	0.051 U	0.025 U
AROCLOR-1221 (ug/l)	0.013 U	0.026 U	0.013 UJ	0.051 U	0.025 U
AROCLOR-1232 (ug/l)	0.013 U	0.026 U	0.013 UJ	0.051 U	0.025 U
AROCLOR-1242 (ug/l)	0.013 U	0.026 U	0.013 UJ	0.051 U	0.025 U
AROCLOR-1248 (ug/l)	0.013 U	0.026 U	0.013 UJ	0.051 U	0.025 U
AROCLOR-1254 (ug/l)	0.013 U	0.044	0.013 UJ	0.067	0.048
AROCLOR-1260 (ug/l)	0.013 UJ	0.18 J	0.013 UJ	0.34 J	0.19 J
PCB, TOTAL (ug/l)	0.0013 UJ	0.22 J	0.0013 UJ	0.41 J	0.24 J

Result Suffix Symbols:

Rana pipiens Developmental Study 2000 PCB Test Results Sediment Samples

Site ID					
Location ID	SE001245	SE001246	SE001247	SE001248	SE001248
Field Sample ID	H3-SE001245-0-0000	H3-SE001246-0-0000	H3-SE001247-0-0000	H3-SE001248-0-0000	H3-SE001248-1-0000
Date Collected	03/30/2000	03/30/2000	03/30/2000	03/30/2000	03/30/2000
Depth	0.0-0.2	0.0-0.2	0.0-0.2	0.0-0.2	0.0-0.2
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE
Analyte					
PCBS					
AROCLOR-1016 (ug/kg)	12000 R	3800 U	1800 U	9800 U	13000 U
AROCLOR-1221 (ug/kg)	12000 R	3800 U	1800 U	9800 U	13000 U
AROCLOR-1232 (ug/kg)	12000 R	3800 U	1800 U	9800 U	13000 U
AROCLOR-1242 (ug/kg)	12000 R	3800 U	1800 U	9800 U	13000 U
AROCLOR-1248 (ug/kg)	12000 R	3800 U	1800 U	9800 U	13000 U
AROCLOR-1254 (ug/kg)	25000 J	7900	2300	18000	22000
AROCLOR-1260 (ug/kg)	130000 J	29000	16000	100000	100000
PCB, TOTAL (ug/kg)	160000 J	37000	18000	120000	120000

Result Suffix Symbols:

Rana pipiens Developmental Study 2000 PCB Test Results Sediment Samples

Site ID					
Location ID	SE001249	SE001250	SE001251	SE001252	SE001253
Field Sample ID	H3-SE001249-0-0000	H3-SE001250-0-0000	H3-SE001251-0-0000	H3-SE001252-0-0000	H3-SE001253-0-0000
Date Collected	03/30/2000	03/30/2000	03/30/2000	03/30/2000	03/30/2000
Depth	0.0-0.2	0.0-0.2	0.0-0.2	0.0-0.2	0.0-0.2
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE
Analyte					
PCBS					
AROCLOR-1016 (ug/kg)	540 U	79.0 U	3900 U	88.0 R	4100 U
AROCLOR-1221 (ug/kg)	540 U	79.0 U	3900 U	88.0 R	4100 U
AROCLOR-1232 (ug/kg)	540 U	79.0 U	3900 U	88.0 R	4100 U
AROCLOR-1242 (ug/kg)	540 U	79.0 U	3900 U	88.0 R	4100 U
AROCLOR-1248 (ug/kg)	540 U	79.0 U	3900 U	88.0 R	4100 U
AROCLOR-1254 (ug/kg)	1100 J	79.0 U	7200	150 J	5100
AROCLOR-1260 (ug/kg)	3200	460	35000	88.0 R	25000
PCB, TOTAL (ug/kg)	4300 J	460	42000	150 J	30000

Result Suffix Symbols:

Rana pipiens Developmental Study 2000 PCB Test Results Sediment Samples

Site ID	
Location ID	SE001279
Field Sample ID	
Date Collected	
Depth	0.0-0.2
Source	EPA_COE
Analyte	
PCBS	
AROCLOR-1016 (ug/kg)	39.0 U
AROCLOR-1221 (ug/kg)	39.0 U
AROCLOR-1232 (ug/kg)	39.0 U
AROCLOR-1242 (ug/kg)	39.0 U
AROCLOR-1248 (ug/kg)	39.0 U
AROCLOR-1254 (ug/kg)	40.0
AROCLOR-1260 (ug/kg)	39.0 U
PCB, TOTAL (ug/kg)	40.0

Result Suffix Symbols:

Appendix C

Tissue Samples For Organic and Metals (COC) Analyses

Exposure Assessment total PCBs

total PCB Analytical Results For Water & Sediment Samples

Organic & Metals Analytical Results (COCs) For Tissue Samples

Leopard Frog Egg Mass Samples

TA -> TV to uniquely represent ovary of adult LF

											TA -> TV to uniquely represent ovary of addit LF
[Freezer]			Date			Total		Dioxin/		PAH/OC	
Location	Sample ID	Site	collected	Description:	Study	PCBs ¹	PCB Congeners ¹	Furans ¹	Metals ¹	Pesticides ¹	New ID
Bag 1	H3TA03RP31-0-F002	31	2000	Ovary	2000 Leopard Frog Study			not analyzed	- unable to te	ll if sample includ	led ovaries (were not frozen separately
Bag 4	H3TA04RP32-0-F001	32	2000	Ovary	2000 Leopard Frog Study						
Bag 2	H3TA04RP32-0-F003	32	2000	Ovary	2000 Leopard Frog Study	Υ					H3TV04RP32-0-F003
Bag 2	H3TA04RP32-0-F006	32	2000	Ovary	2000 Leopard Frog Study	Υ					H3TV04RP32-0-F006
Bag 4	H3TA04RP32-0-F007	32	2000	Ovary	2000 Leopard Frog Study						
Bag 5	H3TA04RP33-0-F002	33	2000	Ovary	2000 Leopard Frog Study						
Bag 5	H3TA04RP33-0-F004	33	2000	Ovary	2000 Leopard Frog Study						
Bag 5	H3TA04RP33-0-F005	33	2000	Ovary	2000 Leopard Frog Study						
Bag 6	H3TA04RP33-0-F006	33	2000	Ovary	2000 Leopard Frog Study						
Bag 6	H3TA04RP33-0-F008	33	2000	Ovary	2000 Leopard Frog Study						
Bag 8	H3TA08RP34-0-F001	34	2000	Egg Mass (ovary)	2000 Leopard Frog Study						
Bag 8	H3TA08RP34-0-F002	34	2000	Egg Mass (ovary)	2000 Leopard Frog Study						
Bag 8	H3TA08RP34-0-F003	34	2000	Egg Mass (ovary)	2000 Leopard Frog Study						
Bag 9	H3TA08RP34-0-F005	34	2000	Egg Mass (ovary)	2000 Leopard Frog Study	Υ					H3TV08RP34-0-F005
Bag 9	H3TA08RP34-0-F006	34	2000	Egg Mass (ovary)	2000 Leopard Frog Study	Υ					H3TV08RP34-0-F006
				_							
Bag 10	H3TA08RP35-0-F001	35	2000	Ovary	2000 Leopard Frog Study						
Bag 10	H3TA08RP35-0-F002	35	2000	Ovary	2000 Leopard Frog Study						
Bag 10	H3TA08RP35-0-F003	35	2000	Ovary	2000 Leopard Frog Study	Υ					H3TV08RP35-0-F003
Bag 11	H3TA08RP35-0-F004	35	2000	Ovary	2000 Leopard Frog Study						
Bag 11	H3TA08RP35-0-F005	35	2000	Ovary	2000 Leopard Frog Study						
Bag 13	H3TA10RP36-0-F001	36	2000	Ovary	2000 Leopard Frog Study						
Bag 17	H3TA10RP37-0-F001	37	2000	Ovary	2000 Leopard Frog Study						
Bag 17	H3TA10RP37-0-F002	37	2000	Ovary	2000 Leopard Frog Study						
Bag 15	H3TA10RP37-0-F003	37	2000	Ovary	2000 Leopard Frog Study						
Bag 15	H3TA10RP37-0-F004	37	2000	Ovary	2000 Leopard Frog Study						
Bag 15	H3TA10RP37-0-F005	37	2000	Ovary	2000 Leopard Frog Study	Υ					H3TV10RP37-0-F005
Bag 15	H3TA10RP37-0-F009	37	2000	Ovary	2000 Leopard Frog Study	Ý					H3TV10RP37-0-F009
Day 13	1101A10NF31-0-F009	31	2000	Ovary	2000 Leopard Frog Study						1131 4 1017531-0-1008

¹Tissue samples selected for organic and metals analyses by EVS Environment Consultants.

Leopard Frog Egg Mass Samples

TA -> TV to uniquely represent ovary of adult LF

											TA -> TV to uniquely represent ovary of adult LF
[Freezer]			Date			Total		Dioxin/		PAH/OC	_
Location	Sample ID	Site	collected	Description:	Study	PCBs ¹	PCB Congeners ¹	Furans ¹	Metals ¹	Pesticides ¹	_New ID
Bag 19	H3TA12RP38-0-F001	38	2000	Ovary	2000 Leopard Frog Study						
Bag 19	H3TA12RP38-0-F002	38	2000	Ovary	2000 Leopard Frog Study						
Bag 19	H3TA12RP38-0-F004	38	2000	Ovary	2000 Leopard Frog Study						
Bag 19	H3TA12RP38-0-F007	38	2000	Ovary	2000 Leopard Frog Study						
Bag 22	H3TA12RP39-0-F001	39	2000	Ovary	2000 Leopard Frog Study	Υ					H3TV12RP39-0-F001
Bag 22	H3TA12RP39-0-F002	39	2000	Ovary	2000 Leopard Frog Study						
Bag 23	H3TA12RP39-0-F006	39	2000	Ovary	2000 Leopard Frog Study						
Bag 23	H3TA12RP39-0-F007	39	2000	Ovary	2000 Leopard Frog Study						
Bag 23	H3TA12RP39-0-F008	39	2000	Ovary	2000 Leopard Frog Study	Υ					H3TV12RP39-0-F008
Bag 23	H3TA12RP39-0-F009	39	2000	Ovary	2000 Leopard Frog Study						
Bag 23	H3TA12RP39-0-F010	39	2000	Ovary	2000 Leopard Frog Study						
Bag 26	R1-F001	R1	2000	Ovary	2000 Leopard Frog Study	Υ					R1-F001(Ovary)
Bag 26	R1-F001	R1	2000	Ovary	2000 Leopard Frog Study						
Bag 26	R1-F001	R1	2000	Ovary	2000 Leopard Frog Study						
Bag 26	R1-F003	R1	2000	Ovary	2000 Leopard Frog Study						
Bag 27	R1-F005	R1	2000	Ovary	2000 Leopard Frog Study						
Bag 27	R1-F005	R1	2000	Ovary	2000 Leopard Frog Study						
Bag 27	R1-F005	R1	2000	Ovary	2000 Leopard Frog Study						
Bag 27	R1-F006	R1	2000	Ovary	2000 Leopard Frog Study	Υ					R1-F006(Ovary)
Bag 30	R2-F009	R2	2000	Ovary	2000 Leopard Frog Study	Υ					R2-F009(Ovary)
Bag 30	R2-F010	R2	2000	Ovary	2000 Leopard Frog Study						
Bag 28	R2-F011	R2	2000	Ovary	2000 Leopard Frog Study						
Bag 28	R2-F011	R2	2000	Ovary	2000 Leopard Frog Study						
Bag 28	R2-F012	R2	2000	Ovary	2000 Leopard Frog Study						
Bag 28	R2-F012	R2	2000	Ovary	2000 Leopard Frog Study	Υ					R2-F012(Ovary)
Bag 31	R3-F001	R3	2000	Ovary	2000 Leopard Frog Study	Υ					R3-F001(Ovary)
Bag 31	R3-F002	R3	2000	Ovary	2000 Leopard Frog Study	Υ					R3-F002(Ovary)
Bag 31	R3-F002	R3	2000	Ovary	2000 Leopard Frog Study						
Bag 31	R3-F003	R3	2000	Ovary	2000 Leopard Frog Study	Υ					R3-F003(Ovary)
Bag 33	R3-F005	R3	2000	Ovary	2000 Leopard Frog Study						
Bag 33	R3-F006	R3	2000	Ovary	2000 Leopard Frog Study						
Bag 33	R3-F006	R3	2000	Ovary	2000 Leopard Frog Study						

¹Tissue samples selected for organic and metals analyses by EVS Environment Consultants.

Leopard Frog Larvae to Metamorph Samples

[Freezer]				Date		Total	=
Location	Site	Sample ID	Description:	collected	Study	PCBs ¹	
Bag 35	33	H3TA04RP33-0-EM01	Dead Larvae	2000	2000 Leopard Frog Study		Not analyzed - only *one* larvae in jar
Bag 36	34	H3TA08RP34-0-EM01	Hatched Embryos 4/18	2000	2000 Leopard Frog Study		
Bag 36	34	H3TA08RP34-0-EM01	Hatched Embryos 5/22	2000	2000 Leopard Frog Study	Y	
Bag 37	35	H3TA08RP35-0-TP01	Tadpoles 5/8	2000	2000 Leopard Frog Study	Υ	
Bag 38	36	H3TA10RP36-0-EM01	Hatched Larvae	2000	2000 Leopard Frog Study		
Bag 38	36	H3TA10RP36-0-EM01	Metamorph (T4 Exposed)	2000	2000 Leopard Frog Study		
Bag 38	36	H3TA10RP36-0-EM01	Tadpoles	2000	2000 Leopard Frog Study		
Bag 38	36	H3TA10RP36-0-EM01	Tadpoles (T4 Exposed)	2000	2000 Leopard Frog Study		
Bag 38	36	H3TA10RP36-0-EM02	Hatched Embryos	2000	2000 Leopard Frog Study		
Bag 38	36	H3TA10RP36-0-EM02	Tadpoles 4/13	2000	2000 Leopard Frog Study	Y	
Bag 39	37	H3TA10RP37-0-TP01	Tadpoles	2000	2000 Leopard Frog Study	Υ	
Bag 39	37	H3TA10RP37-0-TP01	T1Tadpoles 5/9/00	2000	2000 Leopard Frog Study		
Bag 40	39	H3TA12RP39-0-EM01	Hatched Embryos	2000	2000 Leopard Frog Study		
Bag 40	39	H3TA12RP39-0-EM01	Tadpoles 5/23	2000	2000 Leopard Frog Study	Υ	

2000

¹Tissue samples selected for organic and metals analyses by EVS Environment Consultants.

Leopard Frog Adult "Experimental" Samples

TA -> TO to uniquely represent offal portion of adult LF

[Freezer]			Date			Total	РСВ	Dioxin/		PAH/OC	TA-> 10 to uniquely represent onal portion of addit EF
Location	Sample ID	Site	collected	Description:	Study	PCBs ¹	Congeners ¹	Furans ¹	Metals1	Pesticides ¹	New ID
Bag 1	H3TA03RP31-0-F002	31	2000	Body,Liver	2000 Leopard Frog Study		not analyzed - ova	ries were not fr	ozen separatel	y, unable to tell if	body and ovaries separate in sample jar
Bag 4	H3TA04RP32-0-F001	32	2000	Body,Liver	2000 Leopard Frog Study						
Bag 2	H3TA04RP32-0-F003	32	2000	Body,Liver	2000 Leopard Frog Study	Υ					H3TO04RP32-0-F003
Bag 2	H3TA04RP32-0-F006	32	2000	Body,Liver	2000 Leopard Frog Study	Ϋ́	Υ	Υ	Υ	Υ	H3TO04RH 32-0-F006
Bag 4	H3TA04RP32-0-F007	32	2000	Body,Liver	2000 Leopard Frog Study	•	•		•	•	1131 304111 32-0-1 000
Dag 4	11017104111 02-0-1 007	32	2000	Dody, Livei	2000 Leopard Frog Olddy						
Bag 5	H3TA04RP33-0-F002	33	2000	Body,Liver	2000 Leopard Frog Study						
Bag 5	H3TA04RP33-0-F004	33	2000	Body,Liver	2000 Leopard Frog Study						
Bag 5	H3TA04RP33-0-F005	33	2000	Body,Liver	2000 Leopard Frog Study						
Bag 6	H3TA04RP33-0-F006	33	2000	Body,Liver	2000 Leopard Frog Study						
Bag 6	H3TA04RP33-0-F008	33	2000	Body,Liver	2000 Leopard Frog Study						
Bag 8	H3TA08RP34-0-F001	34	2000	Body,Liver	2000 Leopard Frog Study						
Bag 8	H3TA08RP34-0-F002	34	2000	Body,Liver	2000 Leopard Frog Study						
Bag 8	H3TA08RP34-0-F003	34	2000	Body,Liver	2000 Leopard Frog Study						
Bag 9	H3TA08RP34-0-F005	34	2000	Body,Liver	2000 Leopard Frog Study	Υ	Υ	Υ	Υ	Υ	H3TO08RP34-0-F005
Bag 9	H3TA08RP34-0-F006	34	2000	Body,Liver	2000 Leopard Frog Study	Ϋ́	•	•	•	•	H3TO08RP34-0-F006
ŭ				•							
Bag 10	H3TA08RP35-0-F001	35	2000	Body,Liver	2000 Leopard Frog Study						
Bag 10	H3TA08RP35-0-F002	35	2000	Body,Liver	2000 Leopard Frog Study						
Bag 10	H3TA08RP35-0-F003	35	2000	Body,Liver	2000 Leopard Frog Study	Υ					H3TO08RP35-0-F003
Bag 11	H3TA08RP35-0-F004	35	2000	Body,Liver	2000 Leopard Frog Study						
Bag 11	H3TA08RP35-0-F005	35	2000	Body,Liver	2000 Leopard Frog Study						
Bag 13	H3TA10RP36-0-F001	36	2000	Body,Liver	2000 Leopard Frog Study						
Bag 13	H3TA10RP36-0-F002	36	2000	Body,Liver	2000 Leopard Frog Study						
3											
Bag 17	H3TA10RP37-0-F001	37	2000	Body,Liver	2000 Leopard Frog Study						
Bag 17	H3TA10RP37-0-F002	37	2000	Body,Liver	2000 Leopard Frog Study						
Bag 15	H3TA10RP37-0-F003	37	2000	Body,Liver	2000 Leopard Frog Study						
Bag 15	H3TA10RP37-0-F004	37	2000	Body,Liver	2000 Leopard Frog Study						
Bag 15	H3TA10RP37-0-F005	37	2000	Body,Liver	2000 Leopard Frog Study	Υ	Υ	Υ	Υ	Υ	H3TO10RP37-0-F005
Bag 15	H3TA10RP37-0-F009	37	2000	Body,Liver	2000 Leopard Frog Study	Υ	Υ	Υ	Υ	Υ	H3TO10RP37-0-F009
_				-							
Bag 19	H3TA12RP38-0-F001	38	2000	Body,Liver	2000 Leopard Frog Study						
Bag 19	H3TA12RP38-0-F002	38	2000	Body,Liver	2000 Leopard Frog Study						
Bag 19	H3TA12RP38-0-F004	38	2000	Body,Liver	2000 Leopard Frog Study						
Bag 19	H3TA12RP38-0-F007	38	2000	Body,Liver	2000 Leopard Frog Study						
-				=							

¹Tissue samples selected for organic and metals analyses by EVS Environment Consultants.

Leopard Frog Adult "Experimental" Samples

TA -> TO to uniquely represent offal portion of adult LF

											TA -> 10 to uniquely represent onal portion of addit LF
[Freezer]			Date			Total	PCB	Dioxin/		PAH/OC	
Location	Sample ID	Site	collected	Description:	Study	PCBs ¹	Congeners ¹	Furans ¹	Metals1	Pesticides ¹	New ID
Bag 22	H3TA12RP39-0-F001	39	2000	Body,Liver	2000 Leopard Frog Study	Υ	Υ	Υ	Υ	Υ	H3TO12RP39-0-F001
Bag 22	H3TA12RP39-0-F002	39	2000	Body,Liver	2000 Leopard Frog Study						
Bag 23	H3TA12RP39-0-F006	39	2000	Body,Liver	2000 Leopard Frog Study						
Bag 23	H3TA12RP39-0-F007	39	2000	Body,Liver	2000 Leopard Frog Study						
Bag 23	H3TA12RP39-0-F008	39	2000	Body,Liver	2000 Leopard Frog Study	Υ					H3TO12RP39-0-F008
Bag 23	H3TA12RP39-0-F009	39	2000	Body,Liver	2000 Leopard Frog Study						
Bag 23	H3TA12RP39-0-F010	39	2000	Body,Liver	2000 Leopard Frog Study						
Bag 26	R1-F001	R1	2000	Body,Liver	2000 Leopard Frog Study	Υ					R1-F001(Offal)
Bag 26	R1-F003	R1	2000	Body,Liver	2000 Leopard Frog Study						
Bag 27	R1-F005	R1	2000	Body,Liver	2000 Leopard Frog Study						
Bag 27	R1-F006	R1	2000	Body,Liver,Ovary	2000 Leopard Frog Study	Υ	Υ	Υ	Υ	Υ	R1-F006(Offal)
Bag 30	R2-F009	R2	2000	Body,Liver	2000 Leopard Frog Study	Υ	Υ	Υ	Υ	Υ	R2-F009(Offal)
Bag 30	R2-F010	R2	2000	Body,Liver	2000 Leopard Frog Study						
Bag 28	R2-F011	R2	2000	Body,Liver	2000 Leopard Frog Study						
Bag 28	R2-F012	R2	2000	Body,Liver	2000 Leopard Frog Study	Υ					R2-F012(Offal)
•				•	, , ,						
Bag 31	R3-F001	R3	2000	Body,Liver	2000 Leopard Frog Study	Υ					R3-F001(Offal)
Bag 31	R3-F002	R3	2000	Body,Liver	2000 Leopard Frog Study	Υ	Υ	Υ	Υ	Υ	R3-F002(Offal)
Bag 31	R3-F003	R3	2000	Body,Liver	2000 Leopard Frog Study	Υ					R3-F003(Offal)
Bag 33	R3-F005	R3	2000	Body,Liver	2000 Leopard Frog Study						• ,
Bag 33	R3-F006	R3	2000	Body,Liver	2000 Leopard Frog Study						
•				**	, , ,						

¹Tissue samples selected for organic and metals analyses by EVS Environment Consultants.

Adult Leopard Frog Samples for Chemical Analysis

[Freezer] Location	Sample ID	Site	Date collected	Description:	Study	Total PCBs ¹	Composite ID
Bag 1	H3TA03RP31-0-F001	31	2000	Analytical	2000 Leopard Frog Study	Y	H3TA03RP31-0-C001
Бау і	H31AU3KF31-U-FUU1	31	2000	Analytical	2000 Leopard Flog Study	ı	1131A03KF31-0-C001
Bag 2	H3TA04RP32-0-F002	32	2000	Analytical	2000 Leopard Frog Study	Υ	H3TA04RP32-0-C001
Bag 2	H3TA04RP32-0-F005	32	2000	Analytical	2000 Leopard Frog Study		
Bag 4	H3TA04RP32-0-M005	32	2000	Analytical	2000 Leopard Frog Study		
Bag 4	H3TA04RP32-0-M006	32	2000	Analytical	2000 Leopard Frog Study		
Bag 5	H3TA04RP33-0-F003	33	2000	Analytical	2000 Leopard Frog Study	Y	H3TA04RP33-0-C001
Bag 5	H3TA04RP33-0-F007	33	2000	Analytical	2000 Leopard Frog Study		
Bag 6	H3TA04RP33-0-M003	33	2000	Analytical	2000 Leopard Frog Study		
Bag 6	H3TA04RP33-0-M004	33	2000	Analytical	2000 Leopard Frog Study		
Bag 8	H3TA08RP34-0-F004	34	2000	Analytical	2000 Leopard Frog Study	Y	H3TA08RP34-0-C001
Bag 8	H3TA08RP34-0-F007	34	2000	Analytical	2000 Leopard Frog Study		
Bag 10	H3TA08RP35-0-F006	35	2000	Analytical	2000 Leopard Frog Study	Y	H3TA08RP35-0-C001
Bag 10	H3TA08RP35-0-F007	35	2000	Analytical	2000 Leopard Frog Study	'	11017100111 00 0 0001
Bag 11	H3TA08RP35-0-M005	35	2000	Analytical	2000 Leopard Frog Study		
Bag 11	H3TA08RP35-0-M006	35	2000	Analytical	2000 Leopard Frog Study		
Dag II	11017100111 00 0 111000	00	2000	7 inary irodi	2000 Eoopara i rog otaay		
Bag 13	H3TA10RP36-0-F003	36	2000	Analytical	2000 Leopard Frog Study	Υ	H3TA10RP36-0-C001
Bag 13	H3TA10RP36-0-F005	36	2000	Analytical	2000 Leopard Frog Study		
Bag 13	H3TA10RP36-0-M002	36	2000	Analytical	2000 Leopard Frog Study		
Bag 17	H3TA10RP37-0-F007	37	2000	Analytical	2000 Leopard Frog Study	Y	H3TA10RP37-0-C001
Bag 17	H3TA10RP37-0-F008	37	2000	Analytical	2000 Leopard Frog Study		
Bag 16	H3TA10RP37-0-M004	37	2000	Analytical	2000 Leopard Frog Study		
Bag18	H3TA10RP37-0-M006	37	2000	Analytical	2000 Leopard Frog Study		
-			2000	-	•		
Bag 19	H3TA12RP38-0-F003	38	2000	Analytical	2000 Leopard Frog Study	Υ	H3TA12RP38-0-C001
Bag 19	H3TA12RP38-0-F005	38	2000	Analytical	2000 Leopard Frog Study		
Bag 21	H3TA12RP38-0-M005	38	2000	Analytical	2000 Leopard Frog Study		
Bag 21	H3TA12RP38-0-M006	38	2000	Analytical	2000 Leopard Frog Study		
			2000	Analytical	2000 Leopard Frog Study	Υ	H3TA12RP39-0-C001

¹Tissue samples selected for organic and metals analyses by EVS Environment Consultants.

Adult Leopard Frog Samples for Chemical Analysis

[Freezer]			Date			Total	
Location	Sample ID	Site	collected	Description:	Study	PCBs ¹	Composite ID
Bag 22	H3TA12RP39-0-F004	39	2000	Analytical	2000 Leopard Frog Study		
Bag 22	H3TA12RP39-0-F005	39	2000	Analytical	2000 Leopard Frog Study		
Bag 24	H3TA12RP39-0-M001	39	2000	Analytical	2000 Leopard Frog Study		
Bag 24	H3TA12RP39-0-M005	39	2000	Analytical	2000 Leopard Frog Study		
Bag 24	H3TA12RP39-0-M007	39	2000	Analytical	2000 Leopard Frog Study		
Bag 26	R1-F002	R1	2000	Analytical	2000 Leopard Frog Study	Υ	R1-C001
Bag 27	R1-F004	R1	2000	Analytical	2000 Leopard Frog Study		
Bag 25	R1-M002	R1	2000	Analytical	2000 Leopard Frog Study		
Bag 25	R1-M003	R1	2000	Analytical	2000 Leopard Frog Study		
Bag 30	R2-F007	R2	2000	Analytical	2000 Leopard Frog Study	Υ	R2-C001
Bag 30	R2-F008	R2	2000	Analytical	2000 Leopard Frog Study		
Bag 29	R2-M007	R2	2000	Analytical	2000 Leopard Frog Study		
Bag 29	R2-M008	R2	2000	Analytical	2000 Leopard Frog Study		
Bag 33	R3-F004	R3	2000	Analytical	2000 Leopard Frog Study	Υ	R3-C001
Bag32	R3-M004	R3	2000	Analytical	2000 Leopard Frog Study		

¹Tissue samples selected for organic and metals analyses by EVS Environment Consultants.

Leopard Frog Crossover Larvae Samples

FEL Lab	RP	Weston	FEL Lab	Sample	Total	new
Location	Site	Sample I.D. No.	No.	Description	PCBs ¹	ID
Bag 41	R1		R1-F001	Hatched Embryos	Υ	R1-F001-00-C1
	R1		R1-F001	Hatched Embryos	Υ	R1-F001-00-C2
	R1	Crossover Study	R1-F001	Hatched Embryos Raised in Site 33 Water	Υ	R1-F001-33-E1
Bag 42	R4	Spike Study	R4-Egg Mass	FETAX Water/Sand Exposed	Υ	R4-EM01-00-C1
	R4	Spike Study	R4-Egg Mass	Site 40 Water/Sediment Exposed	Υ	R4-EM01-40-E1
	R4	Spike Study	R4-Egg Mass	Site 40 Water/Sed. Spiked w/ 30 mg/kg Aro 1260	Υ	R4-EM01-40-S1

2000

¹Tissue samples selected for organic and metals analyses by EVS Environment Consultants.

Exposure Assessment total PCBs

HOUSATONIC RIVER PROJECT RANA pipiens 2000 STUDY EXPOSURE ASSESSMENT FOR WATER PCB VALUES¹

2000 LEOPARD FROG REPRODUCTION STUDY

		Total PCB (μg/L)
Vernal pool ID	Water sample ID	
E-5	H3-SW000027-0-0M30	0.043
W-9a	H3-SW000030-0-0M30	0.013
W-8	H3-SW000029-0-0M30	0.14
DUP.	H3-SW000029-1-0M30	0.036
W-7a	H3-SW000028-0-0M30	0.03
W-6	H3-SW000032-0-0M30	0.22
W-4	H3-SW000031-0-0M30	0.013
EW-3	H3-SW000034-0-0M30	0.41
E-1	H3-SW000035-0-0M30	0.24
W-1	H3-SW000033-0-0M30	0.013
MP REF.	H9-SW000049-0-0Y24	0.013

¹Based on work done by EVS Environment Consultants.

HOUSATONIC RIVER PROJECT RANA pipiens 2000 STUDY EXPOSURE ASSESSMENT FOR SEDIMENT PCB VALUES¹

2000 LEOPARD FROG REPRODUCTION STUDY

		Total PCB (mg/kg)
Vernal pool ID	Sediment sample ID	
E-5	H3-SE001246-0-0000	37.0
W-9a	H3-SE001249-0-0000	4.3
W-8	H3-SE001248-0-0000	120.0
W-7a	H3-SE001247-0-0000	18.0
W-6	H3-SE001251-0-0000	42.0
W-4	H3-SE001250-0-0000	0.46
EW-3	H3-SE001253-0-0000	30.0
E-1	H3-SE001245-0-0000	160.0
W-1	H3-SE001252-0-0000	0.15
MP REF.	H9-SE001279-0-0000	0.04

¹Based on work done by EVS Environment Consultants.

total PCB Analytical Results for Water and Sediment Samples

Appendix C

Rana pipiens Developmental Study 2000 PCB Test Results Water Samples

Site ID					
Location ID	SW000027	SW000028	SW000029	SW000029	SW000030
Field Sample ID	H3-SW000027-0-0M30	H3-SW000028-0-0M30	H3-SW000029-0-0M30	H3-SW000029-1-0M30	H3-SW000030-0-0M30
Date Collected	03/30/2000	03/30/2000	03/30/2000	03/30/2000	03/30/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE
Analyte					
PCBS					
AROCLOR-1016 (ug/l)	0.013 UJ	0.013 UJ	0.026 U	0.013 UJ	0.013 R
AROCLOR-1221 (ug/l)	0.013 UJ	0.013 UJ	0.026 U	0.013 UJ	0.013 R
AROCLOR-1232 (ug/l)	0.013 UJ	0.013 UJ	0.026 U	0.013 UJ	0.013 R
AROCLOR-1242 (ug/l)	0.013 UJ	0.013 UJ	0.026 U	0.013 UJ	0.013 R
AROCLOR-1248 (ug/l)	0.013 UJ	0.013 UJ	0.026 U	0.013 UJ	0.013 R
AROCLOR-1254 (ug/l)	0.015 J	0.013 UJ	0.029	0.016 J	0.013 R
AROCLOR-1260 (ug/l)	0.028 J	0.030 J	0.11 J	0.020 J	0.013 R
PCB, TOTAL (ug/l)	0.043 J	0.030 J	0.14 J	0.036 J	0.0013 R

Result Suffix Symbols:

Appendix C

Rana pipiens Developmental Study 2000 PCB Test Results Water Samples

Site ID					
Location ID	SW000031	SW000032	SW000033	SW000034	SW000035
Field Sample ID	H3-SW000031-0-0M30	H3-SW000032-0-0M30	H3-SW000033-0-0M30	H3-SW000034-0-0M30	H3-SW000035-0-0M30
Date Collected	03/30/2000	03/30/2000	03/30/2000	03/30/2000	03/30/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE
Analyte					
PCBS					
AROCLOR-1016 (ug/l)	0.013 U	0.026 U	0.013 UJ	0.051 U	0.025 U
AROCLOR-1221 (ug/l)	0.013 U	0.026 U	0.013 UJ	0.051 U	0.025 U
AROCLOR-1232 (ug/l)	0.013 U	0.026 U	0.013 UJ	0.051 U	0.025 U
AROCLOR-1242 (ug/l)	0.013 U	0.026 U	0.013 UJ	0.051 U	0.025 U
AROCLOR-1248 (ug/l)	0.013 U	0.026 U	0.013 UJ	0.051 U	0.025 U
AROCLOR-1254 (ug/l)	0.013 U	0.044	0.013 UJ	0.067	0.048
AROCLOR-1260 (ug/l)	0.013 UJ	0.18 J	0.013 UJ	0.34 J	0.19 J
PCB, TOTAL (ug/l)	0.0013 UJ	0.22 J	0.0013 UJ	0.41 J	0.24 J

Result Suffix Symbols:

Rana pipiens Developmental Study 2000 PCB Test Results Sediment Samples

Site ID					
Location ID	SE001245	SE001246	SE001247	SE001248	SE001248
Field Sample ID	H3-SE001245-0-0000	H3-SE001246-0-0000	H3-SE001247-0-0000	H3-SE001248-0-0000	H3-SE001248-1-0000
Date Collected	03/30/2000	03/30/2000	03/30/2000	03/30/2000	03/30/2000
Depth	0.0-0.2	0.0-0.2	0.0-0.2	0.0-0.2	0.0-0.2
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE
Analyte					
PCBS					
AROCLOR-1016 (ug/kg)	12000 R	3800 U	1800 U	9800 U	13000 U
AROCLOR-1221 (ug/kg)	12000 R	3800 U	1800 U	9800 U	13000 U
AROCLOR-1232 (ug/kg)	12000 R	3800 U	1800 U	9800 U	13000 U
AROCLOR-1242 (ug/kg)	12000 R	3800 U	1800 U	9800 U	13000 U
AROCLOR-1248 (ug/kg)	12000 R	3800 U	1800 U	9800 U	13000 U
AROCLOR-1254 (ug/kg)	25000 J	7900	2300	18000	22000
AROCLOR-1260 (ug/kg)	130000 J	29000	16000	100000	100000
PCB, TOTAL (ug/kg)	160000 J	37000	18000	120000	120000

Result Suffix Symbols:

Rana pipiens Developmental Study 2000 PCB Test Results Sediment Samples

Site ID					
Location ID	SE001249	SE001250	SE001251	SE001252	SE001253
Field Sample ID	H3-SE001249-0-0000	H3-SE001250-0-0000	H3-SE001251-0-0000	H3-SE001252-0-0000	H3-SE001253-0-0000
Date Collected	03/30/2000	03/30/2000	03/30/2000	03/30/2000	03/30/2000
Depth	0.0-0.2	0.0-0.2	0.0-0.2	0.0-0.2	0.0-0.2
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE
Analyte					
PCBS					
AROCLOR-1016 (ug/kg)	540 U	79.0 U	3900 U	88.0 R	4100 U
AROCLOR-1221 (ug/kg)	540 U	79.0 U	3900 U	88.0 R	4100 U
AROCLOR-1232 (ug/kg)	540 U	79.0 U	3900 U	88.0 R	4100 U
AROCLOR-1242 (ug/kg)	540 U	79.0 U	3900 U	88.0 R	4100 U
AROCLOR-1248 (ug/kg)	540 U	79.0 U	3900 U	88.0 R	4100 U
AROCLOR-1254 (ug/kg)	1100 J	79.0 U	7200	150 J	5100
AROCLOR-1260 (ug/kg)	3200	460	35000	88.0 R	25000
PCB, TOTAL (ug/kg)	4300 J	460	42000	150 J	30000

Result Suffix Symbols:

Rana pipiens Developmental Study 2000 PCB Test Results Sediment Samples

Site ID	
Location ID	SE001279
Field Sample ID	
Date Collected	
Depth	0.0-0.2
Source	EPA_COE
Analyte	
PCBS	
AROCLOR-1016 (ug/kg)	39.0 U
AROCLOR-1221 (ug/kg)	39.0 U
AROCLOR-1232 (ug/kg)	39.0 U
AROCLOR-1242 (ug/kg)	39.0 U
AROCLOR-1248 (ug/kg)	39.0 U
AROCLOR-1254 (ug/kg)	40.0
AROCLOR-1260 (ug/kg)	39.0 U
PCB, TOTAL (ug/kg)	40.0

Result Suffix Symbols:

Organic & Metals Analytical Results (COCs) For Tissue Samples

C-of-C ID	RFW0002546	RFW0002546	RFW0002546	RFW0002546	RFW0002546
C-of-C Item	1	2	3	4	5
Field Sample ID	H3-TO08RP34-0-F005	R2-F009(OFFAL)	R1-F006(OFFAL)	H3-TO04RP32-0-F006	H3-TO12RP39-0-F001
Sample Location: Weston (Woodlot)	RP34 (W-7A)	R2 Reference	R1 Reference	RP32 (W-9A)	RP39 (W-1)
Date Collected	04/03/2000	04/26/2000	04/28/2000	05/01/2000	05/03/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA COE	EPA COE	EPA COE	EPA COE	EPA COE
Analyte	_	_	_		
APP IX PESTICIDES					
1,2,3,4-TETRACHLOROBENZENE (ng/g)	2.651 (10)	0.45 J (10)	4.953 (10)	1.32 J (10)	2.232 U (10)
1,2,4,5-TETRACHLOROBENZENE (ng/g)	5.035 (10)	3.797 (10)	8.23 (10)	1.224 J (10)	0.574 J (10)
4,4'-DDD (ng/g)	2.247 U (10)	2.463 U (10)	2.212 U (10)	0.91 J (10)	2.232 U (10)
4,4'-DDE (ng/g)	1.259 J (10)	0.612 J (10)	1.864 J (10)	6.662 (10)	0.926 J (10)
4,4'-DDT (ng/g)	2.247 U (10)	2.463 U (10)	5.795 (10)	4.219 U (10)	5.72 (10)
ALDRIN (ng/g)	2.247 U (10)	2.463 U (10)	2.212 U (10)	4.219 U (10)	2.232 U (10)
ALPHA-BHC (ng/g)	0.095 J (10)	0.339 J (10)	1.102 J (10)	4.219 U (10)	0.145 J (10)
ALPHA-CHLORDANE (ng/g)	2.247 U (10)	2.463 U (10)	2.212 U (10)	4.219 U (10)	2.232 U (10)
BETA-BHC (ng/g)	0.106 J (10)	0.317 J (10)	0.35 J (10)	4.219 U (10)	1.506 J (10)
CHLORPYRIFOS (ng/g)	2.247 U (10)	2.463 U (10)	2.212 U (10)	4.219 U (10)	2.232 U (10)
CIS-NONACHLOR (ng/g)	2.247 U (10)	2.463 U (10)	2.212 U (10)	4.219 U (10)	2.232 U (10)
DELTA-BHC (ng/g)	2.247 U (10)	2.463 U (10)	0.532 J (10)	4.219 U (10)	2.232 U (10)
DIELDRIN (ng/g)	2.247 U (10)	2.463 U (10)	1.4 J (10)	4.219 U (10)	2.232 U (10)
ENDOSULFAN II (ng/g)	2.247 U (10)	2.463 U (10)	2.212 U (10)	4.219 U (10)	2.232 U (10)
ENDRIN (ng/g)	2.247 U (10)	2.463 U (10)	2.212 U (10)	4.219 U (10)	2.232 U (10)
GAMMA BHC (LINDANE) (ng/g)	2.247 U (10)	2.463 U (10)	0.406 J (10)	4.219 U (10)	2.232 U (10)
GAMMA-CHLORDANE (ng/g)	2.247 U (10)	2.463 U (10)	2.212 U (10)	4.219 U (10)	2.232 U (10)
HEPTACHLOR (ng/g)	2.247 U (10)	2.463 U (10)	2.144 J (10)	4.219 U (10)	2.232 U (10)
HEPTACHLOR EPOXIDE (ng/g)	0.307 J (10)	2.463 U (10)	0.059 J (10)	4.219 U (10)	2.232 U (10)
HEXACHLOROBENZENE (ng/g)	0.073 J (10)	0.067 J (10)	0.57 J (10)	4.219 U (10)	0.051 J (10)
MIREX (ng/g)	2.247 U (10)	2.463 U (10)	2.212 U (10)	4.219 U (10)	2.232 U (10)
O,P'-DDD (ng/g)	0.84 J (10)	2.463 U (10)	2.212 U (10)	4.219 U (10)	2.232 U (10)
O,P'-DDE (ng/g)	2.247 U (10)	2.463 U (10)	2.212 U (10)	4.219 U (10)	2.232 U (10)
O,P'-DDT (ng/g)	0.799 J (10)	2.463 U (10)	2.212 U (10)	4.104 J (10)	2.232 U (10)
OXYCHLORDANE (ng/g)	3.256 (10)	2.463 U (10)	1.852 J (10)	0.917 J (10)	1.346 J (10)
PENTACHLOROANISOLE (ng/g)	0.361 J (10)	2.463 U (10)	2.212 U (10)	4.219 U (10)	0.398 J (10)
PENTACHLOROBENZENE (ng/g)	1.534 J (10)	2.463 U (10)	2.212 U (10)	0.356 J (10)	2.232 U (10)
TOXAPHENE (ng/g)	22.5 U (10)	24.6 U (10)	22.1 U (10)	42.2 U (10)	22.3 U (10)
TRANS-NONACHLOR (ng/g)	2.247 U (10)	2.463 U (10)	2.212 U (10)	4.219 U (10)	2.232 U (10)
APP IX PESTICIDES, Total (ng/g)	16.316	5.582	29.257	15.493	10.666

Result Suffix Symbols:

R=Reject 0=Unvalidated U=Undetected 10=Validated

C-of-C ID	RFW0002546	RFW0002546	RFW0002546	RFW0002546	RFW0002546
C-of-C Item	1	2	3	KFV0002540	5
	I TOOSDD24 0 F005	R2-F009(OFFAL)	·	H3-TO04RP32-0-F006	
Field Sample ID		,	R1-F006(OFFAL)		H3-TO12RP39-0-F001
Sample Location: Weston (Woodlot)	,	R2 Reference	R1 Reference	RP32 (W-9A)	RP39 (W-1)
Date Collected		04/26/2000	04/28/2000	05/01/2000	05/03/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE
Analyte					
DIOXINS/FURANS					
1,2,3,4,6,7,8-HPCDD (pg/g)	22.5 U (10)	12.6 J (10)	22.1 U (10)	42.4 U (10)	22.3 U (10)
1,2,3,4,6,7,8-HPCDF (pg/g)	22.5 U (10)	24.6 U (10)	22.1 U (10)	42.4 U (10)	22.3 U (10)
1,2,3,4,7,8,9-HPCDF (pg/g)	22.5 U (10)	8.1 J (10)	1 J (10)	42.4 U (10)	22.3 U (10)
1,2,3,4,7,8-HXCDD (pg/g)	22.5 U (10)	24.6 U (10)	22.1 U (10)	42.4 U (10)	22.3 U (10)
1,2,3,4,7,8-HXCDF (pg/g)	22.5 U (10)	24.6 U (10)	22.1 U (10)	42.4 U (10)	22.3 U (10)
1,2,3,6,7,8-HXCDD (pg/g)	22.5 U (10)	24.6 U (10)	22.1 U (10)	42.4 U (10)	22.3 U (10)
1,2,3,6,7,8-HXCDF (pg/g)	22.5 U (10)	24.6 U (10)	22.1 U (10)	42.4 U (10)	22.3 U (10)
1,2,3,7,8,9-HXCDD (pg/g)	22.5 U (10)	24.6 U (10)	22.1 U (10)	42.4 U (10)	22.3 U (10)
1,2,3,7,8,9-HXCDF (pg/g)	22.5 U (10)	24.6 U (10)	22.1 U (10)	42.4 U (10)	22.3 U (10)
1,2,3,7,8-PECDD (pg/g)	22.5 U (10)	24.6 U (10)	22.1 U (10)	42.4 U (10)	22.3 U (10)
1,2,3,7,8-PECDF (pg/g)	22.5 U (10)	24.6 U (10)	5.4 J (10)	42.4 U (10)	22.3 U (10)
2,3,4,6,7,8-HXCDF (pg/g)	22.5 U (10)	24.6 U (10)	22.1 U (10)	42.4 U (10)	22.3 U (10)
2,3,4,7,8-PECDF (pg/g)	22.5 U (10)	10.1 J (10)	22.1 U (10)	42.4 U (10)	22.3 U (10)
2,3,7,8-TCDD (pg/g)	4.5 U (10)	4.9 U (10)	4.4 U (10)	8.5 U (10)	4.5 U (10)
2,3,7,8-TCDF (pg/g)	4.5 U (10)	4.9 U (10)	4.4 U (10)	8.5 U (10)	4.5 U (10)
OCDD (pg/g)	45 U (10)	60.1 (10)	9.9 J (10)	84.7 U (10)	44.6 U (10)
OCDF (pg/g)	45 U (10)	36.8 J (10)	7 J (10)	84.7 U (10)	21.3 J (10)
DIOXINS/FURANS, Total (pg/g)	,	127.7	23.3	` '	21.3

Result Suffix Symbols:

R=Reject 0=Unvalidated U=Undetected 10=Validated

C-of-C ID	RFW0002546	RFW0002546	RFW0002546	RFW0002546	RFW0002546
C-of-C Item	1	2	3	4	5
	H3-TO08RP34-0-F005	R2-F009(OFFAL)	R1-F006(OFFAL)	H3-TO04RP32-0-F006	H3-TO12RP39-0-F001
Sample Location: Weston (Woodlot)	RP34 (W-7A)	R2 Reference	R1 Reference	RP32 (W-9A)	RP39 (W-1)
Date Collected		04/26/2000	04/28/2000	05/01/2000	05/03/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA COE	EPA COE	EPA COE	EPA COE	EPA COE
Analyte	LI / LOOL	LI /\(\bullet_00L\)	EI / COOL	EI /_OOE	El /\(_\)
METALS					
ALUMINUM (ug/g)	10.25 (10)	8.61 (10)	9.56 (10)	20.75 (10)	11.4 (10)
ARSENIC (ug/g)	0.42 J (10)	0.47 U (10)	0.38 J (10)	0.24 J (10)	0.2 J (10)
BARIUM (ug/g)	5.08 (10)	16.51 (10)	3.99 (10)	12.27 (10)	8.83 (10)
BERYLLIUM (ug/g)	0.09 U (10)	0.09 U (10)	0.1 U (10)	0.14 U (10)	0.1 U (10)
CADMIUM (ug/g)	0.43 (10)	0.13 (10)	0.21 (10)	0.19 (10)	0.26 (10)
CHROMIUM (ug/g)	3.7 (10)	7.44 (10)	2.06 (10)	7.81 (10)	6.41 (10)
COPPER (ug/g)	17.1 (10)	5.42 (10)	6.08 (10)	3.4 (10)	18.46 (10)
IRON (ug/g)	163.51 (10)	63.59 (10)	108.61 (10)	85.38 (10)	111.56 (10)
LEAD (ug/g)	0.29 J (10)	0.15 J (10)	0.12 J (10)	0.75 (10)	0.55 (10)
MAGNESIUM (ug/g)	1145.12 (10)	1554.74 (10)	929.68 (10)	1314.88 (10)	1464.83 (10)
MANGANESE (ug/g)	6.44 (10)	9.27 (10)	6.62 (10)	18.15 (10)	17.28 (10)
MERCURY (ug/g)	0.23 (10)	0.07 J (10)	0.09 J (10)	0.22 (10)	0.13 J (10)
NICKEL (ug/g)	0.47 U (10)	0.47 U (10)	0.51 U (10)	0.69 U (10)	0.03 J (10)
SELENIUM (ug/g)	1.05 (10)	0.24 J (10)	1.17 (10)	0.85 (10)	0.88 (10)
STRONTIUM (ug/g)	4.87 (10)	109.8 (10)	12.23 (10)	14.47 (10)	12.32 (10)
VANADIUM (ug/g)	0.21 J (10)	1.24 (10)	0.25 J (10)	1.15 (10)	1.01 (10)
ZINC (ug/g)	57.63 (10)	95.39 (10)	149.25 (10)	69.44 (10)	110.38 (10)
ORGANIC					
PERCENT LIPIDS (GC) (%)	0.4 (10)	1.2 (10)	3 (10)	0.4 (10)	0.8 (10)
PERCENT LIPIDS (GC/MS) (%)	0.4 (10)	1.2 (10)	3 (10)	0.4 (10)	0.8 (10)
PERCENT LIPIDS (OTHER) (%)	0.4 (10)	1.2 (10)	3 (10)	0.4 (10)	0.8 (10)

Result Suffix Symbols:

R=Reject 0=Unvalidated U=Undetected 10=Validated

C-of-C ID	RFW0002546	RFW0002546	RFW0002546	RFW0002546	RFW0002546
C-of-C Item	1	2	3	4	5
Field Sample ID	H3-TO08RP34-0-F005	R2-F009(OFFAL)	R1-F006(OFFAL)	H3-TO04RP32-0-F006	H3-TO12RP39-0-F001
Sample Location: Weston (Woodlot)	RP34 (W-7A)	R2 Reference	R1 Reference	RP32 (W-9A)	RP39 (W-1)
Date Collected	04/03/2000	04/26/2000	04/28/2000	05/01/2000	05/03/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA COE	EPA COE	EPA COE	EPA COE	EPA COE
Analyte	_			_	
PAHS					
1,6,7-TRIMETHYLNAPHTHALENE (ng/g)	0.4 J (10)	0.5 J (10)	2.5 (10)	1.4 J (10)	0.4 J (10)
1-METHYLNAPHTHALENE (ng/g)	1.2 J (10)	1.1 J (10)	2.5 (10)	3.3 (10)	0.6 J (10)
1-METHYLPHENANTHRENE (ng/g)	0.5 J (10)	2.1 J (10)	3.1 (10)	1.2 J (10)	0.3 J (10)
2,6 DIMETHYLNAPHTHALENE (ng/g)	0.9 J (10)	0.8 J (10)	1.1 J (10)	1.4 J (10)	0.5 J (10)
2-METHYLNAPHTHALENE (ng/g)	2 (10)	1.9 (10)	2.2 (10)	3.4 (10)	1 J (10)
ACENAPHTHENE (ng/g)	1.3 J (10)	1.1 J (10)	0.7 J (10)	1 J (10)	0.2 J (10)
ACENAPTHYLENE (ng/g)	0.4 J (10)	0.3 J (10)	4.6 (10)	0.9 J (10)	0.3 J (10)
ANTHRACENE (ng/g)	0.4 J (10)	0.4 J (10)	0.2 J (10)	0.6 J (10)	0.3 J (10)
BENZO(A)ANTHRACENE (ng/g)	0.3 J (10)	0.2 J (10)	0.2 J (10)	0.5 J (10)	0.4 J (10)
BENZO(A)PYRENE (ng/g)	0.4 J (10)	0.2 J (10)	0.6 J (10)	0.3 J (10)	0.5 J (10)
BENZO(B)FLUORANTHENE (ng/g)	0.4 J (10)	0.2 J (10)	0.2 J (10)	0.6 J (10)	0.4 J (10)
BENZO(E)PYRENE (ng/g)	0.2 J (10)	0.2 J (10)	0.3 J (10)	0.3 J (10)	0.3 J (10)
BENZO(GHI)PERYLENE (ng/g)	0.3 J (10)	0.2 J (10)	0.1 J (10)	0.3 J (10)	0.6 J (10)
BENZO(K)FLUORANTHENE (ng/g)	0.1 J (10)	0.1 J (10)	1.7 U (10)	0.3 J (10)	0.3 J (10)
BIPHENYL (DIPHENYL) (ng/g)	2.4 J (10)	2.7 J (10)	3.9 (10)	4.2 J (10)	1.1 J (10)
C1-CHRYSENES (ng/g)	4.8 U (10)	5.2 U (10)	4.7 U (10)	0.1 J (10)	4.7 U (10)
C1-DIBENZOTHIOPHENES (ng/g)	0.2 J (10)	0.6 J (10)	3.4 (10)	0.5 J (10)	2 U (10)
C1-FLUORANTHENES & PYRENES (ng/g)	0.1 J (10)	0.1 J (10)	0.2 J (10)	0.1 J (10)	0.1 J (10)
C1-FLUORENES (ng/g)	0.4 J (10)	3.6 J (10)	10.3 (10)	4.9 J (10)	2.8 J (10)
C1-NAPHTHALENES (ng/g)	3.2 (10)	3 J (10)	4.7 (10)	6.7 (10)	1.6 J (10)
C1-PHENANTHRENES & ANTHRACENES (ng.	1 J (10)	4.2 J (10)	22.7 (10)	2.1 J (10)	3.5 J (10)
C2-CHRYSENES (ng/g)	0.2 J (10)	5.2 U (10)	0.3 J (10)	0.1 J (10)	4.7 U (10)
C2-DIBENZOTHIOPHENES (ng/g)	2 U (10)	1.5 J (10)	2.3 (10)	0.1 J (10)	2 U (10)

Result Suffix Symbols:

R=Reject 0=Unvalidated U=Undetected 10=Validated

C-of-C ID	RFW0002546	RFW0002546	RFW0002546	RFW0002546	RFW0002546
C-of-C Item	1	2	3	1\(\text{1 \(\text{V}\)0002340	5
	H3-TO08RP34-0-F005	R2-F009(OFFAL)	R1-F006(OFFAL)	H3-TO04RP32-0-F006	H3-TO12RP39-0-F001
Sample Location: Weston (Woodlot)		R2 Reference	R1 Reference	RP32 (W-9A)	RP39 (W-1)
Date Collected	` '	04/26/2000	04/28/2000	05/01/2000	05/03/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA COE	EPA COE	EPA COE	EPA COE	EPA COE
Analyte	EFA_COE	EPA_COE	EFA_COE	EPA_COE	EPA_COE
C2-FLUORENES (ng/g)	0.1 J (10)	0.4 J (10)	15 (10)	1.9 J (10)	0.1 J (10)
(8 87	2.6 J (10)	2.2 J (10)	9 (10)	4.8 J (10)	
C2-NAPHTHALENES (ng/g) C2-PHENANTHRENES & ANTHRACENES (ng.	2.6 J (10) 0.1 J (10)	2.2 J (10) 1 J (10)	1.2 J (10)	0.3 J (10)	0.7 J (10) 4 U (10)
C3-CHRYSENES (ng/g)	0.1 J (10) 0.2 J (10)	5.2 U (10)	0.2 J (10)	0.3 J (10)	0.1 J (10)
C3-DIBENZOTHIOPHENES (ng/g)	2 U (10)	1 J (10)	1.5 J (10)	0.1 J (10)	2 U (10)
C3-FLUORENES (ng/g)	0.4 J (10)	0.3 J (10)	14.6 (10)	0.1 J (10)	1.4 J (10)
C3-NAPHTHALENES (ng/g)	1.1 J (10)	1.1 J (10)	- (- /	2.5 J (10)	- \ '/
C3-PHENANTHRENES & ANTHRACENES (ng.	0.1 J (10)	0.1 J (10)	9.9 (10) 0.7 J (10)	0.1 J (10)	0.6 J (10) 4 U (10)
C4-CHRYSENES (ng/g)	4.8 U (10)	5.2 U (10)	0.7 J (10)	0.1 J (10)	4.7 U (10)
(0 07	0.1 J (10)	0.3 J (10)	(- /	0.1 J (10)	5.1 U (10)
C4-NAPHTHALENES (ng/g) C4-PHENANTHRENES & ANTHRACENES (ng.	0.1 J (10) 0.1 J (10)	4.5 U (10)	2.8 J (10) 0.2 J (10)	0.1 J (10)	0.1 J (10)
1 1 5	0.1 J (10) 0.3 J (10)	4.5 U (10)	(- /		0.1 J (10) 0.6 J (10)
CHRYSENE (ng/g)					(/
DIBENZO(A,H)ANTHRACENE (ng/g)	0.2 J (10)	0.1 J (10)	*** * (***)	0.1 J (10)	0.6 J (10)
DIBENZOTHIOPHENE (ng/g)	0.3 J (10)	0.2 J (10)	0.7 J (10)	0.4 J (10)	0.2 J (10)
FLUORANTHENE (ng/g)	0.8 J (10)	0.5 J (10)	0.6 J (10)	1 J (10)	0.5 J (10)
FLUORENE (ng/g)	1.7 J (10)	1.2 J (10)	1.1 J (10)	1.7 J (10)	0.8 J (10)
INDENO(1,2,3-C,D)PYRENE (ng/g)	0.2 J (10)	0.1 J (10)	0.7 U (10)	0.3 J (10)	0.6 J (10)
NAPHTHALENE (ng/g)	5.2 (10)	4.8 (10)	4.9 (10)	14.6 (10)	4 (10)
PERYLENE (ng/g)	0.4 J (10)	0.3 J (10)	0.9 J (10)	0.1 J (10)	0.8 J (10)
PHENANTHRENE (ng/g)	2.3 J (10)	1.6 J (10)	2.4 (10)	3.2 J (10)	1.1 J (10)
PYRENE (ng/g)	1.1 J (10)	0.4 J (10)	0.6 J (10)	1.1 J (10)	0.5 J (10)
PAHS, Total (ng/g)	33.6	40.8	132.8	68.1	27.9

Result Suffix Symbols:

R=Reject 0=Unvalidated U=Undetected 10=Validated

C-of-C ID	RFW0002546	RFW0002546	RFW0002546	RFW0002546	RFW0002546
C-of-C Item	1	2	3	4	5
Field Sample ID	H3-TO08RP34-0-F005	R2-F009(OFFAL)	R1-F006(OFFAL)	H3-TO04RP32-0-F006	H3-TO12RP39-0-F001
Sample Location: Weston (Woodlot)	RP34 (W-7A)	R2 Reference	R1 Reference	RP32 (W-9A)	RP39 (W-1)
Date Collected	04/03/2000	04/26/2000	04/28/2000	05/01/2000	05/03/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA COE	EPA_COE	EPA COE	EPA COE	EPA_COE
Analyte	_			_	
PCB CONGENERS					
PCB-1 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-101/90 (ng/g)	4.541 (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-105 (ng/g)	3.052 (10)	0.053 (10)	0.124 (10)	15.903 (10)	0.066 (10)
PCB-107 (ng/g)	0.229 (10)	0.0246 U (10)	0.0221 U (10)	0.34 (10)	0.0223 U (10)
PCB-110 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.645 (10)	0.0422 U (10)	0.0223 U (10)
PCB-114 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-118 (ng/g)	3.073 (10)	0.0246 U (10)	0.0221 U (10)	66.876 (10)	0.0223 U (10)
PCB-119 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-126 (ng/g)	0.007 J (10)	0.006 J (10)	0.006 J (10)	0.029 J (10)	0.0223 U (10)
PCB-128 (ng/g)	0.97 (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-129 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-130 (ng/g)	0.492 (10)	0.0246 U (10)	0.0221 U (10)	11.494 (10)	0.0223 U (10)
PCB-135 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-136 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-138/160 (ng/g)	23.181 (10)	0.678 (10)	0.0221 U (10)	67.349 (10)	1.278 (10)
PCB-141/179 (ng/g)	2.326 (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-146 (ng/g)	7.101 (10)	0.0246 U (10)	0.0221 U (10)	27.007 (10)	0.766 (10)
PCB-149/123 (ng/g)	2.066 (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-15 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-151 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-153/132 (ng/g)	39.212 (10)	0.454 (10)	1.801 (10)	239.561 (10)	2.246 (10)
PCB-156 (ng/g)	1.391 (10)	0.0246 U (10)	0.0221 U (10)	19.83 (10)	0.0223 U (10)
PCB-158 (ng/g)	2.462 (10)	0.0246 U (10)	0.0221 U (10)	4.504 (10)	0.0223 U (10)
PCB-16/32 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-166 (ng/g)	0.0225 U (10)	0.096 (10)	0.0221 U (10)	1.903 (10)	0.0223 U (10)
PCB-167 (ng/g)	1.24 (10)	0.0246 U (10)	0.0221 U (10)	19.798 (10)	0.0223 U (10)
PCB-169 (ng/g)	0.042 (10)	0.005 J (10)	0.008 J (10)	0.03 J (10)	0.0223 U (10)
PCB-170/190 (ng/g)	10.737 (10)	0.0246 U (10)	0.0221 U (10)	134.027 (10)	0.284 (10)
PCB-171/202 (ng/g)	2.766 (10)	0.0246 U (10)	0.0221 U (10)	3.104 (10)	0.0223 U (10)
PCB-172 (ng/g)	2.166 (10)	0.0246 U (10)	0.0221 U (10)	3.765 (10)	0.068 (10)
PCB-174 (ng/g)	1.141 (10)	0.0246 U (10)	0.0221 U (10)	0.683 (10)	0.0223 U (10)

Result Suffix Symbols:

R=Reject 0=Unvalidated U=Undetected 10=Validated

C-of-C ID	RFW0002546	RFW0002546	RFW0002546	RFW0002546	RFW0002546
C-of-C Item	1	2	3	4	5
Field Sample ID	H3-TO08RP34-0-F005	R2-F009(OFFAL)	R1-F006(OFFAL)	H3-TO04RP32-0-F006	H3-TO12RP39-0-F001
Sample Location: Weston (Woodlot)	RP34 (W-7A)	R2 Reference	R1 Reference	RP32 (W-9A)	RP39 (W-1)
Date Collected	04/03/2000	04/26/2000	04/28/2000	05/01/2000	05/03/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE
Analyte				_	
PCB-175 (ng/g)	0.463 (10)	0.113 (10)	0.085 (10)	1.206 (10)	0.095 (10)
PCB-176/137 (ng/g)	0.352 (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-177 (ng/g)	1.758 (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-178 (ng/g)	1.356 (10)	0.0246 U (10)	0.0221 U (10)	0.565 (10)	0.0223 U (10)
PCB-18/17 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-180 (ng/g)	33.587 (10)	0.653 (10)	0.458 (10)	160.511 (10)	1.193 (10)
PCB-183 (ng/g)	6.627 (10)	0.0246 U (10)	0.0221 U (10)	36.844 (10)	0.202 (10)
PCB-185 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-187 (ng/g)	40.038 (10)	0.0246 U (10)	0.0221 U (10)	154.679 (10)	1.043 (10)
PCB-189 (ng/g)	0.53 (10)	0.0246 U (10)	0.0221 U (10)	5.701 (10)	0.0223 U (10)
PCB-191 (ng/g)	0.472 (10)	0.0246 U (10)	0.0221 U (10)	3.858 (10)	0.0223 U (10)
PCB-193 (ng/g)	2.63 (10)	0.0246 U (10)	0.0221 U (10)	14.921 (10)	0.0223 U (10)
PCB-194 (ng/g)	8.164 (10)	0.0246 U (10)	0.0221 U (10)	68.913 (10)	0.21 (10)
PCB-195/208 (ng/g)	4.798 (10)	6.743 (10)	0.0221 U (10)	24.754 (10)	0.347 (10)
PCB-197 (ng/g)	0.243 (10)	0.0246 U (10)	0.0221 U (10)	0.419 (10)	0.0223 U (10)
PCB-199 (ng/g)	6.558 (10)	0.0246 U (10)	0.0221 U (10)	19.157 (10)	0.189 (10)
PCB-200 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.011 J (10)
PCB-201/157/173 (ng/g)	0.475 (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-203/196 (ng/g)	8.042 (10)	0.0246 U (10)	0.0221 U (10)	66.487 (10)	0.205 (10)
PCB-205 (ng/g)	0.613 (10)	0.0246 U (10)	0.0221 U (10)	4.425 (10)	0.0223 U (10)
PCB-206 (ng/g)	1.608 (10)	0.0246 U (10)	0.0221 U (10)	10.557 (10)	0.194 (10)
PCB-207 (ng/g)	0.358 (10)	0.248 (10)	0.256 (10)	1.179 (10)	0.0223 U (10)
PCB-209 (ng/g)	0.521 (10)	0.502 (10)	0.31 (10)	1.708 (10)	0.436 (10)
PCB-22/51 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-24/27 (ng/g)	0.191 (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.12 (10)
PCB-25 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-26 (ng/g)	8.467 (10)	0.849 (10)	1.764 (10)	5.088 (10)	0.0223 U (10)
PCB-28 (ng/g)	0.0225 U (10)	0.0246 U (10)	1.68 (10)	0.0422 U (10)	0.0223 U (10)
PCB-29 (ng/g)	1.091 (10)	0.0246 U (10)	0.206 (10)	0.383 (10)	0.0223 U (10)
PCB-30 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-31 (ng/g)	0.0225 U (10)	0.0246 U (10)	1.803 (10)	0.0422 U (10)	0.0223 U (10)
PCB-33/20 (ng/g)	0.0225 U (10)	0.0246 U (10)	5.512 (10)	0.0422 U (10)	0.0223 U (10)

Result Suffix Symbols:

R=Reject 0=Unvalidated U=Undetected 10=Validated

C-of-C ID	RFW0002546	RFW0002546	RFW0002546	RFW0002546	RFW0002546
C-of-C Item	1	2	3	4	5
Field Sample ID	H3-TO08RP34-0-F005	R2-F009(OFFAL)	R1-F006(OFFAL)	H3-TO04RP32-0-F006	H3-TO12RP39-0-F001
Sample Location: Weston (Woodlot)	RP34 (W-7A)	R2 Reference	R1 Reference	RP32 (W-9A)	RP39 (W-1)
Date Collected	04/03/2000	04/26/2000	04/28/2000	05/01/2000	05/03/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA COE	EPA_COE	EPA COE	EPA COE	EPA_COE
Analyte	_	_		_	_
PCB-39 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-40 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-41/64 (ng/g)	0.0225 U (10)	0.0246 U (10)	1.369 (10)	0.0422 U (10)	0.0223 U (10)
PCB-42/59/37 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.621 (10)	0.0422 U (10)	0.0223 U (10)
PCB-44 (ng/g)	0.0225 U (10)	0.0246 U (10)	1.594 (10)	0.0422 U (10)	0.0223 U (10)
PCB-45 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.683 (10)	0.0422 U (10)	0.0223 U (10)
PCB-46 (ng/g)	0.301 (10)	0.0246 U (10)	0.0221 U (10)	0.532 (10)	0.0223 U (10)
PCB-47/75 (ng/g)	3.145 (10)	0.0246 U (10)	0.946 (10)	0.0422 U (10)	0.0223 U (10)
PCB-48 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-49 (ng/g)	0.267 (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-52 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-53 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-56/60 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-63 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-66 (ng/g)	0.213 (10)	0.0246 U (10)	0.779 (10)	0.0422 U (10)	0.0223 U (10)
PCB-67 (ng/g)	0.214 (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-69 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-7/9 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.208 (10)	0.0422 U (10)	0.0223 U (10)
PCB-70 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-72 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-74/61 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.508 (10)	0.0223 U (10)
PCB-77 (ng/g)	0.023 (10)	0.012 J (10)	0.043 (10)	0.049 (10)	0.0223 U (10)
PCB-8/5 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.463 (10)	0.0422 U (10)	36.16 I (10)
PCB-81 (ng/g)	0.0225 U (10)	0.001 J (10)	0.002 J (10)	0.012 J (10)	0.005 J (10)
PCB-82 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-83 (ng/g)	1.673 (10)	0.51 (10)	0.396 (10)	2.367 (10)	0.0223 U (10)
PCB-84 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-85 (ng/g)	0.0225 U (10)	0.0246 U (10)	1.127 (10)	0.0422 U (10)	0.0223 U (10)
PCB-87/115 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-91/55 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.204 (10)
PCB-92 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-95/80 (ng/g)	1.001 (10)	0.469 (10)	0.0221 U (10)	2.046 (10)	0.447 (10)

Result Suffix Symbols:

R=Reject 0=Unvalidated U=Undetected 10=Validated

C-of-C ID	RFW0002546	RFW0002546	RFW0002546	RFW0002546	RFW0002546
C-of-C Item	1	2	3	A	5
Field Sample ID	H3-TO08RP34-0-F005	R2-F009(OFFAL)	R1-F006(OFFAL)	H3-TO04RP32-0-F006	H3-TO12RP39-0-F001
•		R2 Reference	R1 Reference		RP39 (W-1)
Sample Location: Weston (Woodlot)	,			RP32 (W-9A)	\ /
Date Collected		04/26/2000	04/28/2000	05/01/2000	05/03/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE
Analyte					
PCB-97 (ng/g)	0.0225 U (10)	0.0246 U (10)	0.0221 U (10)	0.0422 U (10)	0.0223 U (10)
PCB-99 (ng/g)	4.63 (10)	0.0246 U (10)	1.165 (10)	17.378 (10)	0.0223 U (10)
TOTAL DCB (ng/g)	0.5 J (10)	0.5 J (10)	0.3 J (10)	1.7 J (10)	0.4 J (10)
TOTAL DICB (ng/g)	22.5 U (10)	24.6 U (10)	0.7 J (10)	42.2 U (10)	22.3 U (10)
TOTAL HPCB (ng/g)	104.6 (10)	0.8 J (10)	0.5 J (10)	519.9 (10)	2.9 J (10)
TOTAL HXCB (ng/g)	80.4 (10)	1.2 J (10)	1.8 J (10)	391.4 (10)	4.5 J (10)
TOTAL MCB (ng/g)	22.5 U (10)	24.6 U (10)	22.1 U (10)	42.2 U (10)	22.3 U (10)
TOTAL NCB (ng/g)	2 J (10)	0.2 J (10)	0.3 J (10)	11.7 J (10)	0.2 J (10)
TOTAL OCB (ng/g)	28.9 (10)	6.7 J (10)	22.1 U (10)	184.2 (10)	1 J (10)
TOTAL PECB (ng/g)	18.2 J (10)	1 J (10)	3.5 J (10)	104.9 (10)	0.5 J (10)
TOTAL TCB (ng/g)	4.1 J (10)	24.6 U (10)	6 J (10)	4.2 J (10)	0.2 J (10)
TOTAL TRICB (ng/g)	9.7 J (10)	0.8 J (10)	11 J (10)	5.5 J (10)	0.1 J (10)
PCBS					
AROCLOR-1242 (ng/g)	22.5 U (10)	24.6 U (10)	22.1 U (10)	42.2 U (10)	22.3 U (10)
AROCLOR-1248 (ng/g)	22.5 U (10)	24.6 U (10)	22.1 U (10)	42.2 U (10)	22.3 U (10)
AROCLOR-1254 (ng/g)	22.5 U (10)	24.6 U (10)	22.1 U (10)	42.2 U (10)	22.3 U (10)
AROCLOR-1260 (ng/g)	248.5 (10)	24.6 U (10)	22.1 U (10)	1223.5 (10)	22.3 U (10)
PCB, TOTAL (ng/g)	248.5	11.4	24	1223.5	9.8

Result Suffix Symbols:

R=Reject 0=Unvalidated U=Undetected 10=Validated

C-of-C ID	RFW0002546	RFW0002546	RFW0002546	RFW0002546	RFW0002546
C-of-C Item	6	7	8	14	15
Field Sample ID	H3-TO10RP37-0-F009	H3-TO10RP37-0-F005	R3-F003(OFFAL)	H3-TO04RP32-1-F006	R1-F006(OFFAL)
Sample Location: Weston (Woodlot)	RP37 (EW-3)	RP37 (EW-3)	R3 Reference	RP32 (W-9A)	R1 Reference
Date Collected	05/05/2000	05/10/2000	05/18/2000	05/01/2000	04/28/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE
Analyte					
APP IX PESTICIDES					
1,2,3,4-TETRACHLOROBENZENE (ng/g)	3.443 J (10)	0.471 J (10)	1.659 J (10)	0.72 J (10)	NA
1,2,4,5-TETRACHLOROBENZENE (ng/g)	6.319 (10)	3.391 J (10)	3.011 (10)	2.304 J (10)	NA
4,4'-DDD (ng/g)	0.623 J (10)	4.237 U (10)	2.358 U (10)	0.733 J (10)	NA
4,4'-DDE (ng/g)	6.293 (10)	2.441 J (10)	0.428 J (10)	6.492 (10)	NA
4,4'-DDT (ng/g)	4.184 U (10)	4.237 U (10)	2.358 U (10)	3.759 U (10)	NA
ALDRIN (ng/g)	4.184 U (10)	4.237 U (10)	2.358 U (10)	3.759 U (10)	NA
ALPHA-BHC (ng/g)	4.184 U (10)	4.237 U (10)	0.19 J (10)	3.759 U (10)	NA
ALPHA-CHLORDANE (ng/g)	4.184 U (10)	4.237 U (10)	2.358 U (10)	3.759 U (10)	NA
BETA-BHC (ng/g)	3.092 J (10)	1.857 J (10)	1.835 J (10)	3.759 U (10)	NA
CHLORPYRIFOS (ng/g)	4.184 U (10)	4.237 U (10)	2.358 U (10)	3.759 U (10)	NA
CIS-NONACHLOR (ng/g)	4.184 U (10)	4.237 U (10)	2.358 U (10)	3.759 U (10)	NA
DELTA-BHC (ng/g)	4.184 U (10)	4.237 U (10)	2.358 U (10)	3.759 U (10)	NA
DIELDRIN (ng/g)	4.184 U (10)	4.237 U (10)	2.358 U (10)	3.759 U (10)	NA
ENDOSULFAN II (ng/g)	4.184 U (10)	4.237 U (10)	2.358 U (10)	3.759 U (10)	NA
ENDRIN (ng/g)	4.184 U (10)	4.237 U (10)	2.358 U (10)	3.759 U (10)	NA
GAMMA BHC (LINDANE) (ng/g)	4.184 U (10)	4.237 U (10)	2.358 U (10)	3.759 U (10)	NA
GAMMA-CHLORDANE (ng/g)	4.184 U (10)	4.237 U (10)	2.358 U (10)	3.759 U (10)	NA
HEPTACHLOR (ng/g)	4.184 U (10)	4.237 U (10)	2.358 U (10)	3.759 U (10)	NA
HEPTACHLOR EPOXIDE (ng/g)	4.184 U (10)	4.237 U (10)	2.358 U (10)	3.759 U (10)	NA
HEXACHLOROBENZENE (ng/g)	4.184 U (10)	4.237 U (10)	2.358 U (10)	3.759 U (10)	NA
MIREX (ng/g)	4.184 U (10)	4.237 U (10)	2.358 U (10)	3.759 U (10)	NA
O,P'-DDD (ng/g)	4.184 U (10)	4.237 U (10)	2.358 U (10)	3.759 U (10)	NA
O,P'-DDE (ng/g)	4.184 U (10)	4.237 U (10)	2.358 U (10)	3.759 U (10)	NA
O,P'-DDT (ng/g)	6.786 (10)	4.237 U (10)	2.358 U (10)	4.044 (10)	NA
OXYCHLORDANE (ng/g)	4.292 (10)	0.325 J (10)	0.515 J (10)	0.93 J (10)	NA
PENTACHLOROANISOLE (ng/g)	4.184 U (10)	4.237 U (10)	0.081 J (10)	3.759 U (10)	NA
PENTACHLOROBENZENE (ng/g)	0.282 J (10)	0.427 J (10)	2.358 U (10)	0.269 J (10)	NA
TOXAPHENE (ng/g)	41.8 U (10)	42.4 U (10)	23.6 U (10)	37.6 U (10)	NA
TRANS-NONACHLOR (ng/g)	4.184 U (10)	4.237 U (10)	2.358 U (10)	3.759 U (10)	NA
APP IX PESTICIDES, Total (ng/g)	31.13	8.912	7.291	15.492	NA

Result Suffix Symbols:

R=Reject 0=Unvalidated U=Undetected 10=Validated

C-of-C ID	RFW0002546	RFW0002546	RFW0002546	RFW0002546	RFW0002546
		RFVV0002546			
C-of-C Item	6	/	8	14	15
Field Sample ID		H3-TO10RP37-0-F005	R3-F003(OFFAL)	H3-TO04RP32-1-F006	R1-F006(OFFAL)
Sample Location: Weston (Woodlot)	RP37 (EW-3)	RP37 (EW-3)	R3 Reference	RP32 (W-9A)	R1 Reference
Date Collected	05/05/2000	05/10/2000	05/18/2000	05/01/2000	04/28/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE
Analyte					
DIOXINS/FURANS					
1,2,3,4,6,7,8-HPCDD (pg/g)	41.7 U (10)	42.4 U (10)	23.6 U (10)	18.8 U (10)	NA
1,2,3,4,6,7,8-HPCDF (pg/g)	41.7 U (10)	42.4 U (10)	23.6 U (10)	18.8 U (10)	NA
1,2,3,4,7,8,9-HPCDF (pg/g)	41.7 U (10)	42.4 U (10)	23.6 U (10)	18.8 U (10)	NA
1,2,3,4,7,8-HXCDD (pg/g)	41.7 U (10)	42.4 U (10)	23.6 U (10)	18.8 U (10)	NA
1,2,3,4,7,8-HXCDF (pg/g)	41.7 U (10)	42.4 U (10)	23.6 U (10)	18.8 U (10)	NA
1,2,3,6,7,8-HXCDD (pg/g)	41.7 U (10)	42.4 U (10)	23.6 U (10)	18.8 U (10)	NA
1,2,3,6,7,8-HXCDF (pg/g)	41.7 U (10)	42.4 U (10)	23.6 U (10)	18.8 U (10)	NA
1,2,3,7,8,9-HXCDD (pg/g)	41.7 U (10)	42.4 U (10)	23.6 U (10)	18.8 U (10)	NA
1,2,3,7,8,9-HXCDF (pg/g)	41.7 U (10)	42.4 U (10)	23.6 U (10)	18.8 U (10)	NA
1,2,3,7,8-PECDD (pg/g)	41.7 U (10)	42.4 U (10)	23.6 U (10)	18.8 U (10)	NA
1,2,3,7,8-PECDF (pg/g)	41.7 U (10)	9.3 J (10)	23.6 U (10)	18.8 U (10)	NA
2,3,4,6,7,8-HXCDF (pg/g)	41.7 U (10)	42.4 U (10)	23.6 U (10)	18.8 U (10)	NA
2,3,4,7,8-PECDF (pg/g)	41.7 U (10)	42.4 U (10)	23.6 U (10)	18.8 U (10)	NA
2,3,7,8-TCDD (pg/g)	8.3 U (10)	8.5 U (10)	4.7 U (10)	3.8 U (10)	NA
2,3,7,8-TCDF (pg/g)	8.3 U (10)	8.5 U (10)	4.7 U (10)	3.8 U (10)	NA
OCDD (pg/g)	83.3 U (10)	84.7 U (10)	47.2 U (10)	37.6 U (10)	NA
OCDF (pg/g)	83.3 U (10)	84.7 U (10)	47.2 U (10)	37.6 U (10)	NA
DIOXINS/FURANS, Total (pg/g)		9.3			NA

Result Suffix Symbols:

R=Reject 0=Unvalidated U=Undetected 10=Validated

C-of-C ID	RFW0002546	RFW0002546	RFW0002546	RFW0002546	RFW0002546
C-of-C Item	6	7	8	14	15
	H3-TO10RP37-0-F009	H3-TO10RP37-0-F005	R3-F003(OFFAL)	H3-TO04RP32-1-F006	R1-F006(OFFAL)
Sample Location: Weston (Woodlot)	RP37 (EW-3)	RP37 (EW-3)	R3 Reference	RP32 (W-9A)	R1 Reference
Date Collected		05/10/2000	05/18/2000	05/01/2000	04/28/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA COE	EPA COE	EPA COE	EPA COE	EPA COE
Analyte	LI A_OOL	LI A_OOL	LI A_OOL	LI A_OOL	LI A_OOL
METALS					
ALUMINUM (ug/g)	4.8 J (10)	21.85 (10)	7.79 (10)	NA	6.37 (10)
ARSENIC (ug/g)	0.44 J (10)	0.23 J (10)	0.1 J (10)	NA	0.36 J (10)
BARIUM (ug/g)	8.45 (10)	14.55 (10)	7.49 (10)	NA	5.32 (10)
BERYLLIUM (ug/g)	0.04 J (10)	0.15 U (10)	0.1 U (10)	NA	0.1 U (10)
CADMIUM (ug/g)	0.19 (10)	0.17 (10)	0.25 (10)	NA	0.24 (10)
CHROMIUM (ug/g)	7.83 (10)	10.3 (10)	7.29 (10)	NA	3.03 (10)
COPPER (ug/g)	6.51 (10)	8.18 (10)	74.42 (10)	NA	6.29 (10)
IRON (ug/g)	79.1 (10)	125.03 (10)	224.76 (10)	NA	100.06 (10)
LEAD (ug/g)	0.58 J (10)	0.97 (10)	0.28 J (10)	NA	0.15 J (10)
MAGNESIUM (ug/g)	1191.99 (10)	1688.3 (10)	1480.89 (10)	NA	1100.73 (10)
MANGANESE (ug/g)	13.24 (10)	16.89 (10)	6.35 (10)	NA	7.62 (10)
MERCURY (ug/g)	0.2 J (10)	0.31 (10)	0.14 J (10)	NA	0.1 J (10)
NICKEL (ug/g)	0.56 J (10)	0.74 U (10)	0.52 U (10)	NA	0.09 J (10)
SELENIUM (ug/g)	0.7 J (10)	0.78 (10)	0.41 J (10)	NA	0.88 (10)
STRONTIUM (ug/g)	14.74 (10)	19.41 (10)	57 (10)	NA	19.23 (10)
VANADIUM (ug/g)	0.35 J (10)	1.07 (10)	0.89 (10)	NA	0.36 J (10)
ZINC (ug/g)	70.91 (10)	90.77 (10)	138.98 (10)	NA	140.87 (10)
ORGANIC					
PERCENT LIPIDS (GC) (%)	0.5 (10)	0.6 (10)	0.6 (10)	0.8 (10)	NA
PERCENT LIPIDS (GC/MS) (%)	0.5 (10)	0.6 (10)	0.6 (10)	0.8 (10)	NA
PERCENT LIPIDS (OTHER) (%)	0.5 (10)	0.6 (10)	0.6 (10)	0.8 (10)	3 (10)

Result Suffix Symbols:

R=Reject 0=Unvalidated U=Undetected 10=Validated

C-of-C ID	RFW0002546	RFW0002546	RFW0002546	RFW0002546	RFW0002546
C-of-C Item	6	7	8	14	15
Field Sample ID	H3-TO10RP37-0-F009	H3-TO10RP37-0-F005	R3-F003(OFFAL)	H3-TO04RP32-1-F006	R1-F006(OFFAL)
Sample Location: Weston (Woodlot)	RP37 (EW-3)	RP37 (EW-3)	R3 Reference	RP32 (W-9A)	R1 Reference
Date Collected	05/05/2000	05/10/2000	05/18/2000	05/01/2000	04/28/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA COE	EPA COE	EPA COE	EPA COE	EPA COE
Analyte		_	_	_	
PAHS					
1,6,7-TRIMETHYLNAPHTHALENE (ng/g)	0.6 J (10)	0.9 J (10)	0.5 J (10)	0.7 J (10)	NA
1-METHYLNAPHTHALENE (ng/g)	1.8 J (10)	2 J (10)	1 J (10)	2.2 J (10)	NA
1-METHYLPHENANTHRENE (ng/g)	1.5 J (10)	0.6 J (10)	2.9 (10)	0.7 J (10)	NA
2,6 DIMETHYLNAPHTHALENE (ng/g)	1.4 J (10)	1.4 J (10)	1.1 J (10)	1.4 J (10)	NA
2-METHYLNAPHTHALENE (ng/g)	2.9 J (10)	2.9 J (10)	1.7 J (10)	2.7 J (10)	NA
ACENAPHTHENE (ng/g)	0.6 J (10)	0.3 J (10)	1 J (10)	0.7 J (10)	NA
ACENAPTHYLENE (ng/g)	0.4 J (10)	1.1 J (10)	0.5 J (10)	0.2 J (10)	NA
ANTHRACENE (ng/g)	0.5 J (10)	1 J (10)	0.3 J (10)	0.5 J (10)	NA
BENZO(A)ANTHRACENE (ng/g)	0.6 J (10)	1.3 J (10)	0.2 J (10)	0.4 J (10)	NA
BENZO(A)PYRENE (ng/g)	0.6 J (10)	1.4 J (10)	0.3 J (10)	0.4 J (10)	NA
BENZO(B)FLUORANTHENE (ng/g)	0.4 J (10)	2.1 J (10)	0.2 J (10)	0.3 J (10)	NA
BENZO(E)PYRENE (ng/g)	0.4 J (10)	1.1 J (10)	0.2 J (10)	0.2 J (10)	NA
BENZO(GHI)PERYLENE (ng/g)	0.3 J (10)	1.3 J (10)	0.2 J (10)	0.2 J (10)	NA
BENZO(K)FLUORANTHENE (ng/g)	0.2 J (10)	0.8 J (10)	0.1 J (10)	0.1 J (10)	NA
BIPHENYL (DIPHENYL) (ng/g)	3.7 J (10)	2.8 J (10)	1.9 J (10)	3.1 J (10)	NA
C1-CHRYSENES (ng/g)	1 J (10)	1 J (10)	5 U (10)	7.9 U (10)	NA
C1-DIBENZOTHIOPHENES (ng/g)	0.3 J (10)	0.2 J (10)	0.3 J (10)	0.2 J (10)	NA
C1-FLUORANTHENES & PYRENES (ng/g)	0.1 J (10)	1.3 J (10)	0.1 J (10)	0.3 J (10)	NA
C1-FLUORENES (ng/g)	2.3 J (10)	0.5 J (10)	3.9 J (10)	0.6 J (10)	NA
C1-NAPHTHALENES (ng/g)	4.6 J (10)	4.9 J (10)	2.7 J (10)	4.9 J (10)	NA
C1-PHENANTHRENES & ANTHRACENES (ng.	1.9 J (10)	1.8 J (10)	6.2 (10)	1.4 J (10)	NA
C2-CHRYSENES (ng/g)	0.3 J (10)	0.1 J (10)	0.1 J (10)	0.1 J (10)	NA
C2-DIBENZOTHIOPHENES (ng/g)	3.8 U (10)	0.1 J (10)	0.1 J (10)	0.1 J (10)	NA

Result Suffix Symbols:

R=Reject 0=Unvalidated U=Undetected 10=Validated

C-of-C ID	RFW0002546	RFW0002546	RFW0002546	RFW0002546	RFW0002546
C-of-C Item	6	7	8	14	15
	H3-TO10RP37-0-F009	H3-TO10RP37-0-F005	R3-F003(OFFAL)	H3-TO04RP32-1-F006	R1-F006(OFFAL)
Sample Location: Weston (Woodlot)	RP37 (EW-3)	RP37 (EW-3)	R3 Reference	RP32 (W-9A)	R1 Reference
Date Collected	05/05/2000	05/10/2000	05/18/2000	05/01/2000	04/28/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA COE	EPA COE	EPA COE	EPA COE	EPA_COE
Analyte	<u> </u>	LI /\(\frac{1}{2}\)OOL	<u> </u>	El //_OOE	<u> </u>
C2-FLUORENES (ng/g)	0.4 J (10)	0.2 J (10)	0.1 J (10)	0.7 J (10)	NA
C2-NAPHTHALENES (ng/g)	3.2 J (10)	3.5 J (10)	2.7 J (10)	3.4 J (10)	NA
C2-PHENANTHRENES & ANTHRACENES (ng.	0.4 J (10)	0.8 J (10)	4.3 U (10)	0.2 J (10)	NA
C3-CHRYSENES (ng/g)	8.8 U (10)	9 U (10)	5 U (10)	7.9 U (10)	NA
C3-DIBENZOTHIOPHENES (ng/g)	0.1 J (10)	0.1 J (10)	0.2 J (10)	3.4 U (10)	NA
C3-FLUORENES (ng/g)	0.3 J (10)	0.7 J (10)	0.5 J (10)	0.3 J (10)	NA
C3-NAPHTHALENES (ng/g)	1.1 J (10)	1.4 J (10)	0.6 J (10)	1.4 J (10)	NA
C3-PHENANTHRENES & ANTHRACENES (ng.	7.6 U (10)	0.3 J (10)	4.3 U (10)	6.8 U (10)	NA
C4-CHRYSENES (ng/g)	0.2 J (10)	9 U (10)	5 U (10)	0.1 J (10)	NA
C4-NAPHTHALENES (ng/g)	9.5 U (10)	9.6 U (10)	0.1 J (10)	0.1 J (10)	NA
C4-PHENANTHRENES & ANTHRACENES (ng.	0.1 J (10)	0.2 J (10)	0.1 J (10)	0.1 J (10)	NA
CHRYSENE (ng/g)	0.4 J (10)	1.9 J (10)	0.3 J (10)	1.1 J (10)	NA
DIBENZO(A,H)ANTHRACENE (ng/g)	0.3 J (10)	0.4 J (10)	0.1 J (10)	0.2 J (10)	NA
DIBENZOTHIOPHENE (ng/g)	0.3 J (10)	0.3 J (10)	0.2 J (10)	0.4 J (10)	NA
FLUORANTHENE (ng/g)	0.7 J (10)	2.6 J (10)	0.4 J (10)	0.6 J (10)	NA
FLUORENE (ng/g)	1.2 J (10)	2.2 J (10)	1 J (10)	1.8 J (10)	NA
INDENO(1,2,3-C,D)PYRENE (ng/g)	0.4 J (10)	1.3 J (10)	0.3 J (10)	0.2 J (10)	NA
NAPHTHALENE (ng/g)	6.7 J (10)	9.5 (10)	3.2 J (10)	7 (10)	NA
PERYLENE (ng/g)	0.1 J (10)	0.4 J (10)	0.3 J (10)	0.4 J (10)	NA
PHENANTHRENE (ng/g)	2.7 J (10)	2.6 J (10)	1.6 J (10)	2.4 J (10)	NA
PYRENE (ng/g)	0.8 J (10)	2.8 J (10)	0.5 J (10)	0.8 J (10)	NA
PAHS, Total (ng/g)	45.8	62.1	37.7	42.6	NA

Result Suffix Symbols:

R=Reject 0=Unvalidated U=Undetected 10=Validated

C-of-C ID	RFW0002546	RFW0002546	RFW0002546	RFW0002546	RFW0002546
C-of-C Item	6	7	8	14	15
Field Sample ID	H3-TO10RP37-0-F009	H3-TO10RP37-0-F005	R3-F003(OFFAL)	H3-TO04RP32-1-F006	R1-F006(OFFAL)
Sample Location: Weston (Woodlot)	RP37 (EW-3)	RP37 (EW-3)	R3 Reference	RP32 (W-9A)	R1 Reference
Date Collected	05/05/2000	05/10/2000	05/18/2000	05/01/2000	04/28/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA COE	EPA_COE	EPA COE	EPA COE	EPA_COE
Analyte					
PCB CONGENERS					
PCB-1 (ng/g)	0.0418 U (10)	0.119 (10)	1.036 (10)	0.0376 U (10)	NA
PCB-101/90 (ng/g)	1.37 (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-105 (ng/g)	16.212 (10)	4.776 (10)	0.147 (10)	14.418 (10)	NA
PCB-107 (ng/g)	0.79 (10)	0.0424 U (10)	0.0236 U (10)	0.378 (10)	NA
PCB-110 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-114 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-118 (ng/g)	64.477 (10)	20.725 (10)	0.0236 U (10)	65.983 (10)	NA
PCB-119 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-126 (ng/g)	0.046 (10)	0.015 J (10)	0.011 J (10)	0.014 J (10)	NA
PCB-128 (ng/g)	0.344 (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-129 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-130 (ng/g)	13.302 (10)	4.135 (10)	0.0236 U (10)	10.705 (10)	NA
PCB-135 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-136 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-138/160 (ng/g)	110.088 (10)	52.725 (10)	1.293 (10)	73.119 (10)	NA
PCB-141/179 (ng/g)	0.501 (10)	0.0424 U (10)	0.0236 U (10)	0.342 (10)	NA
PCB-146 (ng/g)	61.976 (10)	3.667 (10)	0.0236 U (10)	27.124 (10)	NA
PCB-149/123 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-15 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-151 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-153/132 (ng/g)	311.246 (10)	77.189 (10)	1.26 (10)	242.134 (10)	NA
PCB-156 (ng/g)	18.663 (10)	12.425 (10)	0.0236 U (10)	18.837 (10)	NA
PCB-158 (ng/g)	13.832 (10)	2.95 (10)	0.0236 U (10)	3.964 (10)	NA
PCB-16/32 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-166 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.196 (10)	1.943 (10)	NA
PCB-167 (ng/g)	23.107 (10)	15.697 (10)	0.0236 U (10)	19.77 (10)	NA
PCB-169 (ng/g)	0.059 (10)	0.052 (10)	0.0236 U (10)	0.014 J (10)	NA
PCB-170/190 (ng/g)	159.194 (10)	131.063 (10)	0.261 (10)	125.741 (10)	NA
PCB-171/202 (ng/g)	13.346 (10)	0.538 (10)	0.0236 U (10)	3.251 (10)	NA
PCB-172 (ng/g)	7.034 (10)	0.0424 U (10)	0.0236 U (10)	3.838 (10)	NA
PCB-174 (ng/g)	0.859 (10)	0.0424 U (10)	0.0236 U (10)	0.604 (10)	NA

Result Suffix Symbols:

R=Reject 0=Unvalidated U=Undetected 10=Validated

C-of-C ID	RFW0002546	RFW0002546	RFW0002546	RFW0002546	RFW0002546
C-of-C Item	6	7	8	14	15
Field Sample ID	H3-TO10RP37-0-F009	H3-TO10RP37-0-F005	R3-F003(OFFAL)	H3-TO04RP32-1-F006	R1-F006(OFFAL)
Sample Location: Weston (Woodlot)	RP37 (EW-3)	RP37 (EW-3)	R3 Reference	RP32 (W-9A)	R1 Reference
Date Collected	05/05/2000	05/10/2000	05/18/2000	05/01/2000	04/28/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA COE	EPA_COE	EPA COE	EPA COE	EPA_COE
Analyte	_	_	_	_	
PCB-175 (ng/g)	2.733 (10)	0.294 (10)	0.137 (10)	1.091 (10)	NA
PCB-176/137 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-177 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-178 (ng/g)	1.587 (10)	0.0424 U (10)	0.0236 U (10)	0.614 (10)	NA
PCB-18/17 (ng/g)	0.825 (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-180 (ng/g)	195.561 (10)	144.36 (10)	1.056 (10)	167.952 (10)	NA
PCB-183 (ng/g)	80.026 (10)	12.815 (10)	0.0236 U (10)	35.934 (10)	NA
PCB-185 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-187 (ng/g)	141.952 (10)	12.14 (10)	0.318 (10)	154.005 (10)	NA
PCB-189 (ng/g)	5.701 (10)	5.562 (10)	0.0236 U (10)	5.767 (10)	NA
PCB-191 (ng/g)	8.974 (10)	4.886 (10)	0.0236 U (10)	3.866 (10)	NA
PCB-193 (ng/g)	30.166 (10)	0.0424 U (10)	0.0236 U (10)	14.715 (10)	NA
PCB-194 (ng/g)	71.261 (10)	82.37 (10)	0.169 (10)	67.485 (10)	NA
PCB-195/208 (ng/g)	32.581 (10)	24.498 (10)	13.202 (10)	23.824 (10)	NA
PCB-197 (ng/g)	0.941 (10)	0.0424 U (10)	0.0236 U (10)	0.472 (10)	NA
PCB-199 (ng/g)	35.994 (10)	2.15 (10)	0.0236 U (10)	18.732 (10)	NA
PCB-200 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-201/157/173 (ng/g)	0.891 (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-203/196 (ng/g)	86.143 (10)	71.305 (10)	0.0236 U (10)	64.702 (10)	NA
PCB-205 (ng/g)	5.277 (10)	5.318 (10)	0.0236 U (10)	4.326 (10)	NA
PCB-206 (ng/g)	11.119 (10)	11.149 (10)	0.0236 U (10)	10.44 (10)	NA
PCB-207 (ng/g)	1.218 (10)	0.915 (10)	0.272 (10)	1.155 (10)	NA
PCB-209 (ng/g)	1.351 (10)	1.362 (10)	0.438 (10)	1.489 (10)	NA
PCB-22/51 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-24/27 (ng/g)	2.402 (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-25 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-26 (ng/g)	101.295 (10)	1.861 (10)	0.8 (10)	7.605 (10)	NA
PCB-28 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-29 (ng/g)	11.616 (10)	0.0424 U (10)	0.0236 U (10)	1.063 (10)	NA
PCB-30 (ng/g)	0.854 (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-31 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-33/20 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.501 (10)	0.0376 U (10)	NA

Result Suffix Symbols:

R=Reject 0=Unvalidated U=Undetected 10=Validated

C-of-C ID	RFW0002546	RFW0002546	RFW0002546	RFW0002546	RFW0002546
C-of-C Item	6	7	8	14	15
Field Sample ID	H3-TO10RP37-0-F009	H3-TO10RP37-0-F005	R3-F003(OFFAL)	H3-TO04RP32-1-F006	R1-F006(OFFAL)
Sample Location: Weston (Woodlot)	RP37 (EW-3)	RP37 (EW-3)	R3 Reference	RP32 (W-9A)	R1 Reference
Date Collected	05/05/2000	05/10/2000	05/18/2000	05/01/2000	04/28/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE
Analyte					
PCB-39 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-40 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-41/64 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-42/59/37 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-44 (ng/g)	0.0418 U (10)	0.618 (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-45 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-46 (ng/g)	3.375 (10)	0.0424 U (10)	0.0236 U (10)	0.31 (10)	NA
PCB-47/75 (ng/g)	7.299 (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-48 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-49 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-52 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-53 (ng/g)	0.598 (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-56/60 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-63 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-66 (ng/g)	0.113 (10)	1.562 (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-67 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-69 (ng/g)	0.443 (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-7/9 (ng/g)	1.286 (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-70 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-72 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-74/61 (ng/g)	1.314 (10)	0.0424 U (10)	0.0236 U (10)	0.457 (10)	NA
PCB-77 (ng/g)	0.119 (10)	0.0424 U (10)	0.007 J (10)	0.116 (10)	NA
PCB-8/5 (ng/g)	0.799 (10)	0.0424 U (10)	32.258 I (10)	0.0376 U (10)	NA
PCB-81 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.005 J (10)	0.08 (10)	NA
PCB-82 (ng/g)	1.101 (10)	0.0424 U (10)	1.622 (10)	0.0376 U (10)	NA
PCB-83 (ng/g)	43.875 (10)	0.58 (10)	0.36 (10)	1.943 (10)	NA
PCB-84 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-85 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-87/115 (ng/g)	0.519 (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-91/55 (ng/g)	0.0418 U (10)	0.584 (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-92 (ng/g)	0.0418 U (10)	0.0424 U (10)	0.0236 U (10)	0.0376 U (10)	NA
PCB-95/80 (ng/g)	6.824 (10)	0.0424 U (10)	0.616 (10)	1.575 (10)	NA

Result Suffix Symbols:

R=Reject 0=Unvalidated U=Undetected 10=Validated

C-of-C ID	RFW0002546	RFW0002546	RFW0002546	RFW0002546	RFW0002546
C-of-C Item	6	7	8	14	15
	H3-TO10RP37-0-F009	H3-TO10RP37-0-F005	R3-F003(OFFAL)	H3-TO04RP32-1-F006	R1-F006(OFFAL)
Sample Location: Weston (Woodlot)	RP37 (EW-3)	RP37 (EW-3)	R3 Reference	RP32 (W-9A)	R1 Reference
Date Collected	05/05/2000	05/10/2000	05/18/2000	05/01/2000	04/28/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE
Analyte				_	
PCB-97 (ng/g)	0.0418 U (10)	0.0424 U (10)	2.188 (10)	0.0376 U (10)	NA
PCB-99 (ng/g)	48.523 (10)	4.305 (10)	0.0236 U (10)	16.98 (10)	NA
TOTAL DCB (ng/g)	1.4 J (10)	1.4 J (10)	0.4 J (10)	1.5 J (10)	NA
TOTAL DICB (ng/g)	2.1 J (10)	42.4 U (10)	23.6 U (10)	37.6 U (10)	NA
TOTAL HPCB (ng/g)	647.1 (10)	311.7 (10)	1.8 J (10)	517.4 (10)	NA
TOTAL HXCB (ng/g)	553.1 (10)	168.8 (10)	2.9 J (10)	398.4 (10)	NA
TOTAL MCB (ng/g)	41.8 U (10)	0.1 J (10)	1 J (10)	37.6 U (10)	NA
TOTAL NCB (ng/g)	12.3 J (10)	12.1 J (10)	0.3 J (10)	11.6 J (10)	NA
TOTAL OCB (ng/g)	233.1 (10)	185.6 (10)	13.4 J (10)	179.5 (10)	NA
TOTAL PECB (ng/g)	183.7 (10)	30.4 J (10)	4.9 J (10)	101.3 (10)	NA
TOTAL TCB (ng/g)	17 J (10)	3.5 J (10)	23.6 U (10)	3.8 J (10)	NA
TOTAL TRICB (ng/g)	117 (10)	1.9 J (10)	1.3 J (10)	8.7 J (10)	NA
PCBS					
AROCLOR-1242 (ng/g)	41.8 U (10)	42.4 U (10)	23.6 U (10)	37.6 U (10)	NA
AROCLOR-1248 (ng/g)	41.8 U (10)	42.4 U (10)	23.6 U (10)	37.6 U (10)	NA
AROCLOR-1254 (ng/g)	41.8 U (10)	42.4 U (10)	23.6 U (10)	37.6 U (10)	NA
AROCLOR-1260 (ng/g)	1766.8 (10)	715.4 (10)	23.6 U (10)	1222.1 (10)	NA
PCB, TOTAL (ng/g)	1766.8	715.4	26	1222.1	NA

Result Suffix Symbols:

R=Reject 0=Unvalidated U=Undetected 10=Validated

C-of-C ID	RFW0002542	RFW0002542	RFW0002542	RFW0002542	RFW0002542	
C-of-C Item	1	2	3	4	5	
Field Sample ID	R3-F001(OVARY)	R3-F002(OVARY)	R3-F003(OVARY)	R3-F002(OFFAL)	R3-F001(OFFAL)	
Sample Location: Weston (Woodlot)	R3 Reference	R3 Reference	R3 Reference	R3 Reference	R3 Reference	
Date Collected	05/18/2000	05/18/2000	05/18/2000	05/18/2000	05/18/2000	
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE	
Analyte						
ORGANIC						
PERCENT LIPIDS (GC) (%)	6.3 (11)	6.7 (11)	8.2 (11)	0.7 (11)	0.4 (11)	
PCBS						
AROCLOR-1242 (ng/g)	44.2 U (11)	46.7 U (11)	44.1 U (11)	35.8 U (11)	37.2 U (11)	
AROCLOR-1248 (ng/g)	44.2 U (11)	46.7 U (11)	44.1 U (11)	35.8 U (11)	37.2 U (11)	
AROCLOR-1254 (ng/g)	44.2 U (11)	46.7 U (11)	44.1 U (11)	35.8 U (11)	37.2 U (11)	
AROCLOR-1260 (ng/g)	44.2 U (11)	46.7 U (11)	44.1 U (11)	35.8 U (11)	37.2 U (11)	
PCB, TOTAL (ng/g)	21.9	24.1	27	12.7	6	

Field Sample ID Symbols:
R=Reference Specimen
F=Female
EM=Egg Mass, Phase I
MM=Metamorph, Phase I
MC=Metamorph, Crossover Study, Phase I
TP=Tadpole Larvae, Phase II
C=Metamorph Composite, Phase III

Result Suffix Symbols:

C-of-C ID	RFW0002542	RFW0002542	RFW0002542	RFW0002542	RFW0002542	
C-of-C Item	6	7	8	11	12	
Field Sample ID	R3-C001	H3-TA08RP34-0-EM01	H3-TA12RP39-0-EM01	H3-TV08RP34-0-F005	H3-TV08RP34-0-F006	
Sample Location: Weston (Woodlot)	R3 Reference	RP34 (W-7A)	RP39 (W-1)	RP34 (W-7A)	RP34 (W-7A)	
Date Collected	05/18/2000	05/22/2000	05/23/2000	04/03/2000	04/03/2000	
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE	
Analyte						
ORGANIC						
PERCENT LIPIDS (GC) (%)	1.6 (11)	0.1 (11)	0.1 U (11)	7 (11)	5.8 (11)	
PCBS						
AROCLOR-1242 (ng/g)	48.8 U (11)	175.4 U (11)	400 U (11)	45.9 U (11)	42.2 U (11)	
AROCLOR-1248 (ng/g)	48.8 U (11)	175.4 U (11)	400 U (11)	45.9 U (11)	42.2 U (11)	
AROCLOR-1254 (ng/g)	48.8 U (11)	175.4 U (11)	400 U (11)	45.9 U (11)	42.2 U (11)	
AROCLOR-1260 (ng/g)	48.8 U (11)	1104.8 (11)	400 U (11)	1631.9 (11)	26806.4 (11)	
PCB, TOTAL (ng/g)	13.6	1104.8	49.2	1631.9	26806.4	

Field Sample ID Symbols:
R=Reference Specimen
F=Female
EM=Egg Mass, Phase I
MM=Metamorph, Phase I
MC=Metamorph, Crossover Study, Phase I
TP=Tadpole Larvae, Phase II
C=Metamorph Composite, Phase III

Result Suffix Symbols:

C-of-C ID	RFW0002542	RFW0002542	RFW0002542	RFW0002545	RFW0002545	
C-of-C Item	13	14	21	7	16	
Field Sample ID	H3-TO08RP34-0-F006	H3-TA08RP34-0-C001	H3-TV08RP34-1-F006	H3-TA12RP39-0-C001	R2-F009(OVARY)	
Sample Location: Weston (Woodlot)	RP34 (W-7A)	RP34 (W-7A)	RP34 (W-7A)	RP39 (W-1)	R2 Reference	
Date Collected	04/03/2000	04/03/2000	04/03/2000	04/19/2000	04/26/2000	
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE	
Analyte						
ORGANIC						
PERCENT LIPIDS (GC) (%)	0.3 (11)	1.9 (11)	5.7 (11)	0.4 (11)	3.6 (11)	
PCBS						
AROCLOR-1242 (ng/g)	43.5 U (11)	46.3 U (11)	40.3 U (11)	32.4 U (11)	41.5 U (11)	
AROCLOR-1248 (ng/g)	43.5 U (11)	46.3 U (11)	40.3 U (11)	32.4 U (11)	41.5 U (11)	
AROCLOR-1254 (ng/g)	43.5 U (11)	46.3 U (11)	40.3 U (11)	32.4 U (11)	41.5 U (11)	
AROCLOR-1260 (ng/g)	2562.5 (11)	2113.8 (11)	23876.1 (11)	154.4 (11)	41.5 U (11)	
PCB, TOTAL (ng/g)	2562.5	2113.8	23876.1	154.4	7.8	

Field Sample ID Symbols:
R=Reference Specimen
F=Female
EM=Egg Mass, Phase I
MM=Metamorph, Phase I
MC=Metamorph, Crossover Study, Phase I
TP=Tadpole Larvae, Phase II
C=Metamorph Composite, Phase III

Result Suffix Symbols:

R=Reject 0=Unvalidated U=Undetected 10=Validated

J=Estimated 11=Completeness Check Complete

C-of-C ID	RFW0002545	RFW0002545	RFW0002545	RFW0002545	RFW0002548	
C-of-C Item	17	17 18		20	4	
Field Sample ID	R2-F012(OVARY)	R2-F012(OFFAL)	R1-F001(OFFAL)	H3-TA12RP39-1-C001	R4-EM01-00-C1	
Sample Location: Weston (Woodlot)	R2 Reference	R2 Reference	R1 Reference	RP39 (W-1)	R4 Reference	
Date Collected	04/26/2000	04/26/2000	04/28/2000	04/19/2000	11/13/2000	
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE	
Analyte						
ORGANIC						
PERCENT LIPIDS (GC) (%)	11.2 (11)	0.4 (11)	0.5 (11)	0.5 (11)	0.58 (11)	
PCBS						
AROCLOR-1242 (ng/g)	58.1 U (11)	39.2 U (11)	39.7 U (11)	48.3 U (11)	303 U (11)	
AROCLOR-1248 (ng/g)	58.1 U (11)	39.2 U (11)	39.7 U (11)	48.3 U (11)	303 U (11)	
AROCLOR-1254 (ng/g)	58.1 U (11)	39.2 U (11)	39.2 U (11) 39.7 U (11) 48.3 U (11)		303 U (11)	
AROCLOR-1260 (ng/g)	58.1 U (11)	39.2 U (11)	U (11) 39.7 U (11) 48.3 U (11)		303 U (11)	
PCB, TOTAL (ng/g)	14.9	1.2	2	171.3	3.5	

Field Sample ID Symbols:
R=Reference Specimen
F=Female
EM=Egg Mass, Phase I
MM=Metamorph, Phase I
MC=Metamorph, Crossover Study, Phase I
TP=Tadpole Larvae, Phase II
C=Metamorph Composite, Phase III

Result Suffix Symbols:

C-of-C ID	RFW0002548	RFW0002548	RFW0002550	RFW0002550	RFW0002550	
C-of-C Item	5	6	1	3	4	
Field Sample ID	R4-EM01-40-E1	R4-EM01-40-S1	R2-C001	R1-F001-00-C1	R1-F001-00-C2	
Sample Location: Weston (Woodlot)	R4 Reference	R4 Reference	R2 Reference	R1 Reference	R1 Reference	
Date Collected	11/13/2000	11/13/2000	04/26/2000	04/28/2000	04/28/2000	
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE	
Analyte						
ORGANIC						
PERCENT LIPIDS (GC) (%)	0.3 (11)	0.4 (11)	1.8 (11)	0.1 U (11)	2.6 (11)	
PCBS						
AROCLOR-1242 (ng/g)	178.6 U (11)	135.1 U (11)	34 U (11)	119 U (11)	270.3 U (11)	
AROCLOR-1248 (ng/g)	178.6 U (11)	135.1 U (11)	34 U (11)	119 U (11)	270.3 U (11)	
AROCLOR-1254 (ng/g)	178.6 U (11)	110.2 J (11)	34 U (11)	119 U (11)	270.3 U (11)	
AROCLOR-1260 (ng/g)	178.6 U (11)	440.8 (11)	34 U (11)	119 U (11)	270.3 U (11)	
PCB, TOTAL (ng/g)	6.5	551	28	42.1	67.6	

Field Sample ID Symbols:
R=Reference Specimen
F=Female
EM=Egg Mass, Phase I
MM=Metamorph, Phase I
MC=Metamorph, Crossover Study, Phase I
TP=Tadpole Larvae, Phase II
C=Metamorph Composite, Phase III

Result Suffix Symbols:

C-of-C ID	RFW0002550	RFW0002550	RFW0002550	RFW0002550	RFW0002550
C-of-C Item	5	6	7	8	9 H3-TA04RP33-0-C001
Field Sample ID	R1-F001-33-E1	R1-F001(OVARY)	R1-F006(OVARY)	R1-C001	
Sample Location: Weston (Woodlot)	R1 Reference	R1 Reference	R1 Reference	R1 Reference	RP33 (W-8)
Date Collected	04/28/2000	04/28/2000	04/28/2000	04/28/2000	04/30/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE
Analyte					
ORGANIC					
PERCENT LIPIDS (GC) (%)	0.1 U (11)	2.2 (11)	1.2 (11)	1.6 (11)	1.6 (11)
PCBS					
AROCLOR-1242 (ng/g)	476.2 U (11)	43.5 U (11)	133.3 U (11)	41.5 U (11)	34.7 U (11)
AROCLOR-1248 (ng/g)	476.2 U (11)	43.5 U (11)	133.3 U (11)	41.5 U (11)	34.7 U (11)
AROCLOR-1254 (ng/g)	37.3 J (11)	43.5 U (11)	133.3 U (11)	41.5 U (11)	34.7 U (11)
AROCLOR-1260 (ng/g)	335.8 J (11)	43.5 U (11)	133.3 U (11)	41.5 U (11)	5387.6 (11)
PCB, TOTAL (ng/g)	373.1	31.2	40.9	35.5	5387.6

Field Sample ID Symbols:
R=Reference Specimen
F=Female
EM=Egg Mass, Phase I
MM=Metamorph, Phase I
MC=Metamorph, Crossover Study, Phase I
TP=Tadpole Larvae, Phase II
C=Metamorph Composite, Phase III

Result Suffix Symbols:

C-of-C ID	RFW0002550	RFW0002550	RFW0002550	RFW0002550	RFW0002550
C-of-C Item	10	11	12	13	14
Field Sample ID	H3-TV04RP32-0-F003	H3-TV04RP32-0-F006	H3-TO04RP32-0-F003	H3-TA04RP32-0-C001	H3-TA10RP37-0-C001
Sample Location: Weston (Woodlot)	RP32 (W-9A)	RP32 (W-9A)	RP32 (W-9A)	RP32 (W-9A)	RP37 (EW-3)
Date Collected	05/01/2000	05/01/2000	05/01/2000	05/01/2000	05/01/2000
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE
Analyte					
ORGANIC					
PERCENT LIPIDS (GC) (%)	35.7 (11)	0.1 U (11)	1.7 (11)	1.6 (11)	1.7 (11)
PCBS					
AROCLOR-1242 (ng/g)	196.1 U (11)	303 U (11)	41 U (11)	26.7 U (11)	30.8 U (11)
AROCLOR-1248 (ng/g)	196.1 U (11)	28.3 J (11)	41 U (11)	26.7 U (11)	30.8 U (11)
AROCLOR-1254 (ng/g)	196.1 U (11)	303 U (11)	41 U (11)	26.7 U (11)	30.8 U (11)
AROCLOR-1260 (ng/g)	45085.9 (11)	536.8 (11)	1259.5 (11)	3586.9 (11)	4264.8 (11)
PCB, TOTAL (ng/g)	45085.9	565	1259.5	3586.9	4264.8

Field Sample ID Symbols:
R=Reference Specimen
F=Female
EM=Egg Mass, Phase I
MM=Metamorph, Phase I
MC=Metamorph, Crossover Study, Phase I
TP=Tadpole Larvae, Phase II
C=Metamorph Composite, Phase III

Result Suffix Symbols:

C-of-C ID	RFW0002550	RFW0002550	RFW0002550	RFW0002550	RFW0002551	
C-of-C Item	15	16 H3-TA08RP35-0-C001 H3	17	20	1 H3-TO08RP35-0-F003	
Field Sample ID	H3-TV08RP35-0-F003		H3-TA10RP36-0-C001	H3-TO04RP32-1-F003		
Sample Location: Weston (Woodlot)	RP35 (W-6)	RP35 (W-6)	RP36 (W-4)	RP32 (W-9A)	RP35 (W-6)	
Date Collected	05/02/2000	05/03/2000	05/05/2000	05/01/2000	05/02/2000	
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE	
Analyte						
ORGANIC						
PERCENT LIPIDS (GC) (%)	25 (11)	1.3 (11)	1 (11)	1.6 (11)	0.8 (11)	
PCBS						
AROCLOR-1242 (ng/g)	51 U (11)	35 U (11)	42.7 U (11)	45.7 U (11)	42 U (11)	
AROCLOR-1248 (ng/g)	51 U (11)	35 U (11)	42.7 U (11)	45.7 U (11)	42 U (11)	
AROCLOR-1254 (ng/g)	51 U (11)	35 U (11)	42.7 U (11)	45.7 U (11)	42 U (11)	
AROCLOR-1260 (ng/g)	9477.1 (11)	1755.3 (11)	343.3 (11)	1500.1 (11)	386.4 (11)	
PCB, TOTAL (ng/g)	9477.1	1755.3	343.3	1500.1	386.4	

Field Sample ID Symbols:
R=Reference Specimen
F=Female
EM=Egg Mass, Phase I
MM=Metamorph, Phase I
MC=Metamorph, Crossover Study, Phase I
TP=Tadpole Larvae, Phase II
C=Metamorph Composite, Phase III

Result Suffix Symbols:

C-of-C ID	RFW0002551	RFW0002551	RFW0002551	RFW0002551	RFW0002551	
C-of-C Item	2	3	4	5	6 H3-TV10RP37-0-F009	
Field Sample ID	H3-TA12RP38-0-C001	H3-TV12RP39-0-F001	H3-TV12RP39-0-F008	H3-TO12RP39-0-F008		
Sample Location: Weston (Woodlot)	RP38 (E-1)	RP39 (W-1)	RP39 (W-1)	RP39 (W-1)	RP37 (EW-3)	
Date Collected	05/02/2000	05/03/2000	05/04/2000	05/04/2000	05/05/2000	
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE	
Analyte						
ORGANIC						
PERCENT LIPIDS (GC) (%)	1.3 (11)	14.1 (11)	1.6 (11)	0.7 (11)	0.4 (11)	
PCBS						
AROCLOR-1242 (ng/g)	38.5 U (11)	46.1 U (11)	1428.6 U (11)	37.3 U (11)	555.6 U (11)	
AROCLOR-1248 (ng/g)	38.5 U (11)	46.1 U (11)	1428.6 U (11)	37.3 U (11)	555.6 U (11)	
AROCLOR-1254 (ng/g)	38.5 U (11)	46.1 U (11)	1428.6 U (11)	37.3 U (11)	555.6 U (11)	
AROCLOR-1260 (ng/g)	3085.4 (11)	240.4 (11)	290.9 J (11)	37.3 U (11)	5612.7 (11)	
PCB, TOTAL (ng/g)	3085.4	240.4	290.9	25	5612.7	

Field Sample ID Symbols:
R=Reference Specimen
F=Female
EM=Egg Mass, Phase I
MM=Metamorph, Phase I
MC=Metamorph, Crossover Study, Phase I
TP=Tadpole Larvae, Phase II
C=Metamorph Composite, Phase III

Result Suffix Symbols:

C-of-C ID	RFW0002551	RFW0002551	RFW0002551	RFW0002551	RFW0002551	
C-of-C Item	7	7 8		11	12	
Field Sample ID	H3-TA08RP35-0-TP01	H3-TA10RP36-0-EM02	H3-TA10RP37-0-TP01	H3-TV10RP37-0-F005	H3-TA03RP31-0-F001	
Sample Location: Weston (Woodlot)	RP35 (W-6)	RP36 (W-4)	RP37 (EW-3)	RP37 (EW-3)	RP31 (E-5)	
Date Collected	05/08/2000	05/08/2000	05/09/2000	05/10/2000	05/10/2000	
Depth	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	0.0-0.0	
Source	EPA_COE	EPA_COE	EPA_COE	EPA_COE	EPA_COE	
Analyte						
ORGANIC						
PERCENT LIPIDS (GC) (%)	0.1 (11)	1.7 (11)	2.9 (11)	0.4 (11)	0.6 (11)	
PCBS						
AROCLOR-1242 (ng/g)	232.6 U (11)	1111.1 U (11)	125 U (11)	588.2 U (11)	40 U (11)	
AROCLOR-1248 (ng/g)	232.6 U (11)	1111.1 U (11)	47.9 J (11)	588.2 U (11)	40 U (11)	
AROCLOR-1254 (ng/g)	232.6 U (11)	1111.1 U (11) 479.5 (11)		588.2 U (11)	40 U (11)	
AROCLOR-1260 (ng/g)	675.8 (11)	1429.8 (11)	431.5 (11)	415.4 J (11)	1308.2 (11)	
PCB, TOTAL (ng/g)	675.8	1429.8	959	415.4	1308.2	

Field Sample ID Symbols:
R=Reference Specimen
F=Female
EM=Egg Mass, Phase I
MM=Metamorph, Phase I
MC=Metamorph, Crossover Study, Phase I
TP=Tadpole Larvae, Phase II
C=Metamorph Composite, Phase III

Result Suffix Symbols:

C-of-C ID	RFW0002551
C-of-C Item	19
Field Sample ID	H3-TA03RP31-1-F001
Sample Location: Weston (Woodlot)	RP31 (E-5)
Date Collected	05/10/2000
Depth	0.0-0.0
Source	EPA_COE
Analyte	
ORGANIC	
PERCENT LIPIDS (GC) (%)	0.5 (11)
PCBS	
AROCLOR-1242 (ng/g)	42.4 U (11)
AROCLOR-1248 (ng/g)	42.4 U (11)
AROCLOR-1254 (ng/g)	42.4 U (11)
AROCLOR-1260 (ng/g)	1161.1 (11)
PCB, TOTAL (ng/g)	1161.1

Field Sample ID Symbols:
R=Reference Specimen
F=Female
EM=Egg Mass, Phase I
MM=Metamorph, Phase I
MC=Metamorph, Crossover Study, Phase I
TP=Tadpole Larvae, Phase II
C=Metamorph Composite, Phase III

Result Suffix Symbols:

Appendix D

Reproductive Specimens Inventory List

Reproductive Data:

Female Assessment
Male Assessment
Correlation Plots

HOUSATONIC RIVER PROJECT RANA pipiens REPRODUCTIVE STUDY 2000 SAMPLE TRACKING INVENTORY SITE E-5 (TARGET LOCATION 31)

			Female Count and Assessment			Male Co	Male Count and Assessment		
Weston		Sample			Artificial			Artificial	
Sample ID	C-of-C No.	Date	Adult	Juvenile	Fert.	Adult	Juvenile	Fert.	
H3TA03RP31-0-F001	2065	3/24/2000		1					
H3TA03RP31-0-F002	2187	4/21/2000	1						
							1		
COLUMN	TOTALS:		1	1	0	0	0	0	

1

HOUSATONIC RIVER PROJECT RANA pipiens REPRODUCTIVE STUDY 2000 SAMPLE TRACKING INVENTORY SITE W-9a (TARGET LOCATION 32)

			Female C	ount and A	ssessment	Male Co	ount and As	sessment
Weston		Sample			Artificial			Artificial
Sample ID	C-of-C No.	Date	Adult	Juvenile	Fert.	Adult	Juvenile	Fert.
H3TA04RP32-0-F001	2066	3/25/2000	1		1			
H3TA04RP32-0-F002	2066	3/25/2000	1					
H3TA04RP32-0-F003	2066	3/25/2000	1					
H3TA04RP32-0-F005	2066	3/25/2000	1					
H3TA04RP32-0-F006	2066	3/26/2000		1				
H3TA04RP32-0-F007	2097	4/3/2000	1		1			
H3TA04RP32-0-M001	2066	3/25/2000				1		1
H3TA04RP32-0-M002	2066	3/26/2000				1		1
H3TA04RP32-0-M003	2066	3/26/2000				1		1
H3TA04RP32-0-M004	2066	3/26/2000				1		1
H3TA04RP32-0-M005	2066	3/26/2000				1		
H3TA04RP32-0-M006	2066	3/26/2000				1		
H3TA04RP32-0-M007	2066	3/25/2000				1		
COLUMN T	TOTALS:	l	5	1	2	7	0	4

HOUSATONIC RIVER PROJECT RANA pipiens REPRODUCTIVE STUDY 2000 SAMPLE TRACKING INVENTORY SITE W-8 (TARGET LOCATION 33)

			Female C	ount and A	ssessment	Male C	ount and As	sessment
Weston	0 (0 N	Sample	A -1 11	1	Artificial	A -1 11		Artificial
Sample ID	C-of-C No.	Date	Adult	Juvenile	Fert.	Adult	Juvenile	Fert.
H3TA04RP33-0-F002	2064	3/26/2000		1				
H3TA04RP33-0-F003	2064	3/26/2000	1					
H3TA04RP33-0-F004	2064	3/26/2000		1				
H3TA04RP33-0-F005	2064	3/26/2000		1				
H3TA04RP33-0-F006	2064	3/26/2000	1					
H3TA04RP33-0-F007	2099	4/3/2000	1					
H3TA04RP33-0-F008	2116	4/4/2000		1				
H3TA04RP33-0-M001	2064	3/25/2000				11		
H3TA04RP33-0-M002	2064	3/25/2000				1		
H3TA04RP33-0-M003	2064	3/25/2000				1		
H3TA04RP33-0-M004	2064	3/25/2000				1		
H3TA04RP33-0-M005	2064	3/26/2000				1		
H3TA04RP33-0-M006	2064	3/26/2000				11		
COLUMN	TOTALS:	•	3	4	0	6	0	0

HOUSATONIC RIVER PROJECT RANA pipiens REPRODUCTIVE STUDY 2000 SAMPLE TRACKING INVENTORY SITE W-7a (TARGET LOCATION 34)

			Female C	ount and A	ssessment	Male Co	unt and As	sessment
Weston Sample ID	C-of-C No.	Sample Date	Adult	Juvenile	Artificial Fert.	Adult	Juvenile	Artificial Fert.
H3TA08RP34-0-F001	2067	3/25/2000	1	00.1010	1	7100.11	00.1010	
H3TA08RP34-0-F002	2067	3/26/2000	1		1			
H3TA08RP34-0-F003	2067	3/26/2000	1		1			
H3TA08RP34-0-F004	2067	3/26/2000	1					
H3TA08RP34-0-F005	2067	3/26/2000	1		1			
H3TA08RP34-0-F006	2067	3/26/2000	1		1			
H3TA08PR34-0-F007	2186	4/21/2000	1					
H3TA08RP34-0-M001	2067	3/25/2000				1		1
H3TA08RP34-0-M002	2067	3/26/2000				1		1
H3TA08RP34-0-M003	2077	3/28/2000				1		1
H3TA08RP34-0-M004	2077	3/28/2000				1		1
H3TA08RP34-0-M005	2077	3/28/2000				1		
2011	TOTA: C		-	6	_	-		
COLUMN	TOTALS:		7	0	5	5	0	4

HOUSATONIC RIVER PROJECT RANA pipiens REPRODUCTIVE STUDY 2000 SAMPLE TRACKING INVENTORY SITE W-6 (TARGET LOCATION 35)

			Female Co	ount and As	sessment	Male Co	ount and As	sessment
Weston		Sample			Artificial			Artificial
Sample ID	C-of-C No.	Date	Adult	Juvenile	Fert.	Adult	Juvenile	Fert.
H3TA08RP35-0-F001	2069	3/26/2000	1		1			
H3TA08RP35-0-F002	2069	3/26/2000	1		1			
H3TA08RP35-0-F003	2069	3/26/2000	1					
H3TA08RP35-0-F004	2069	3/26/2000	1		1			
H3TA08RP35-0-F005	2069	3/26/2000	1					
H3TA08RP35-0-F006	2076	3/28/2000	1					
H3TA08RP35-0-F007	2076	3/28/2000	1					
H3TA08RP35-0-M001	2069	3/25/2000				1		1
H3TA08RP35-0-M002	2069	3/25/2000				1		1
H3TA08RP35-0-M003	2069	3/25/2000				1		1
H3TA08RP35-0-M004	2069	3/25/2000				1		1
H3TA08RP35-0-M005	2069	3/26/2000				1		
H3TA08RP35-0-M006	2069	3/26/2000				1		
COLUMN	TOTALS		7	0	2	6	0	Λ
COLUMN	TOTALS:		7	0	3	6	0	4

HOUSATONIC RIVER PROJECT RANA pipiens REPRODUCTIVE STUDY 2000 SAMPLE TRACKING INVENTORY SITE W-4 (TARGET LOCATION 36)

			Female C	ount and As	sessment	Male Co	ount and Ass	sessment
Weston		Sample			Artificial			Artificial
Sample ID	C-of-C No.	Date	Adult	Juvenile	Fert.	Adult	Juvenile	Fert.
H3TA10RP36-0-F001	2068	3/25/2000	1		1			
H3TA10RP36-0-F002	2068	3/26/2000	1		1			
H3TA10RP36-0-F003	2068	3/26/2000	1					
H3TA10RP36-0-F005	2172	4/16/2000	1					
H3TA10RP36-0-M001	2068	3/26/2000				1		
H3TA10RP36-0-M002	2068	3/26/2000				1		
H3TA10RP36-0-M003	2118	4/4/2000				1		
H3TA10RP36-0-M004	2144	4/13/2000				1		1
H3TA10RP36-0-M005	2075	3/28/2000				1		
COLLIMN	TOTALS:	<u> </u>	4	0	2	5	0	1
COLUMN	IOIALS.		7	U		J	U	'

HOUSATONIC RIVER PROJECT RANA pipiens REPRODUCTIVE STUDY 2000 SAMPLE TRACKING INVENTORY SITE EW-3 (TARGET LOCATION 37)

			Female C	ount and As	ssessment	Male Co	unt and Ass	sessment
Weston		Sample			Artificial			Artificial
Sample ID	C-of-C No.	Date	Adult	Juvenile	Fert.	Adult	Juvenile	Fert.
H3TA10RP37-0-F001	2072	3/26/2000	1		1			
H3TA10RP37-0-F002	2072	3/26/2000	1		1			
H3TA10RP37-0-F003	2072	3/26/2000	1		1			
H3TA10RP37-0-F004	2074	3/27/2000		1				
H3TA10RP37-0-F005	2074	3/27/2000		1				
H3TA10RP37-0-F006	2080	3/29/2000	Died in to	ransit-Rede	signated as	0-D001		
H3TA10RP37-0-F007	2100	4/3/2000	1					
H3TA10RP37-0-F008	2100	4/3/2000	1					
H3TA10RP37-0-F009	2074	3/28/2000		1				
H3TA10RP37-0-M001	2072	3/26/2000				1		1
H3TA10RP37-0-M002	2072	3/26/2000				1		1
H3TA10RP37-0-M003	2072	3/26/2000				1		1
H3TA10RP37-0-M004	2072	3/26/2000				1		
H3TA10RP37-0-M005	2072	3/26/2000				1		1
H3TA10RP37-0-M006	2072	3/26/2000				1		
H3TA10RP37-0-M008	2074	3/28/2000				1		
COLUMN	TOTALS:		5	3	3	7	0	4

HOUSATONIC RIVER PROJECT RANA pipiens REPRODUCTIVE STUDY 2000 SAMPLE TRACKING INVENTORY SITE E-1 (TARGET LOCATION 38)

			Female C	ount and As	sessment	Male Co	ount and As	sessment
Weston Sample ID	C-of-C No.	Sample Date	Adult	Juvenile	Artificial Fert.	Adult	Juvenile	Artificial Fert.
H3TA12RP38-0-F001	2063	03/24/00	1	ouvernic	1	Addit	ouvernic	i Cit.
H3TA12RP38-0-F002	2003	03/26/00	1		1			
H3TA12RP38-0-F003	2071	03/26/00	1		ı			
H3TA12RP38-0-F004	2071	03/26/00						
H3TA12RP38-0-F005	2092	03/30/00						
H3TA12RP38-0-F007	2092		1		1			
H3TA12RP38-0-M001	2063	04/04/00	1		1	1		1
		03/24/00						1
H3TA12RP38-0-M002	2063	03/24/00				1		1
H3TA12RP38-0-M003	2071	03/26/00				1		1
H3TA12RP38-0-M004	2071	03/26/00				1		
H3TA12RP38-0-M005	2071	03/26/00				1		
H3TA12RP38-0-M006	2071	03/27/00				1		
H3TA12RP38-0-M007	2079	03/29/00				1		1
H3TA12RP38-0-M008	2101	4/3/2000				1		
							_	
COLUMN	TOTALS:		6	0	3	8	0	4

HOUSATONIC RIVER PROJECT RANA pipiens REPRODUCTIVE STUDY 2000 SAMPLE TRACKING INVENTORY SITE W-1 (TARGET LOCATION 39)

			Female Co	ount and As	sessment	Male Co	unt and As	sessment
Weston		Sample			Artificial			Artificial
Sample ID	C-of-C No.	Date	Adult	Juvenile	Fert.	Adult	Juvenile	Fert.
H3TA12RP39-0-F001	2070	3/26/2000	1		1			
H3TA12RP39-0-F002	2070	3/26/2000	1		1			
H3TA12RP39-0-F003	2098	4/3/2000	1					
H3TA12RP39-0-F004	2113	4/4/2000	1					
H3TA12RP39-0-F005	2114	4/4/2000	1					
H3TA12RP39-0-F006	2115	4/4/2000	1					
H3TA12RP39-0-F007	2143	4/11/2000		1				
H3TA12RP39-0-F008	2143	4/11/2000		1				
H3TA12RP39-0-F009	2183	4/20/2000	1					
H3TA12RP39-0-F010	2185	4/21/2000	1					
H3TA12RP39-0-M001	2070	3/25/2000				1		
H3TA12RP39-0-M002	2070	3/26/2000				1		1
H3TA12RP39-0-M003	2070	3/26/2000				1		1
H3TA12RP39-0-M004	2070	3/26/2000				1		1
H3TA12RP39-0-M005	2070	3/26/2000				1		
H3TA12RP39-0-M006	2070	3/26/2000				1		1
H3TA12RP39-0-M007	2143	4/11/2000				1		
COLUMN	TOTALS:		8	2	2	7	0	4

HOUSATONIC RIVER PROJECT RANA pipiens REPRODUCTIVE STUDY 2000 SAMPLE TRACKING INVENTORY EXTERNAL REFERENCES R1, R2, AND R3

	Date Received	Female C	Count and As	ssessment	Male Co	ount and As	sessment
FEL	From Carolina			Artificial			Artificial
Sample ID	Biological Supply	Adult	Juvenile	Fert.	Adult	Juvenile	Fert.
R1-07574-001-F001	4/26/2000	1		1			
R1-07574-002-F002	4/26/2000	1					
R1-07574-003-F003	4/26/2000	1		1			
R1-07574-004-F004	4/26/2000	1					
R1-07574-005-F005	4/26/2000	1		1			
R1-07574-006-F006	4/26/2000	1					
R2-07574-007-F007	4/26/2000	1					
R2-07574-008-F008	4/26/2000	1					
R2-07574-009-F009	4/26/2000	1		1			
R2-07574-010-F010	4/26/2000	1		1			
R2-07574-011-F011	4/26/2000	1		1			
R2-07574-012-F012	4/26/2000	1		1			
R1-07574-013-M001	4/26/2000				1		1
R1-07574-014-M002	4/26/2000				1		
R1-07574-015-M003	4/26/2000				1		
R1-07574-016-M004	4/26/2000				1		1
R1-07574-017-M005	4/26/2000				1		1
R1-07574-018-M006	4/26/2000				1		1
R2-07574-019-M007	4/26/2000				1		
R2-07574-020-M008	4/26/2000				1		
R2-07574-021-M009	4/26/2000				1		1
R2-07574-022-M010	4/26/2000				1		1
R2-07574-023-M011	4/26/2000				1		1
R2-07574-024-M012	4/26/2000				1		1
R3-07641-001-F001	5/17/2000	1		1			
R3-07641-002-F002	5/17/2000	1		1			
R3-07641-003-F003	5/17/2000	1		1			
R3-07641-004-F004	5/17/2000	1					
R3-07641-005-F005	5/17/2000	1		1			
R3-07641-006-F006	5/17/2000	1		1			
R3-07641-007-M001	5/17/2000				1		1
R3-07641-008-M002	5/17/2000				1		1
R3-07641-009-M003	5/17/2000				1		1
R3-07641-010-M004	5/17/2000				1		
R3-07641-011-M005	5/17/2000				1		1
R3-07641-012-M006	5/17/2000				1		1
COLUMN T	OTALS:	18	0	12	18	0	13

		Assessed						Total								Ovary Sec	ions											Stripped E				_
Spicimen	Specimen	Maturity ¹ (Adult/	Body Wt					Ovary Wt		Section	Lt Ovary Section	Right Section	Left Section	Total Egg	Oocytes Per Gram				< Stage III						Stripped Egg	Attempted Egg Fert.	Ferti Egg		Normal A Egg	ppearing	Hatched Egg	
Location Site 31 (E-5)	F001 (A)	Juvenile)	(g) 19.125	Wt (g)	Wt (g)	Wt (g)	Wt (g)	Body Wt)	(Y/N)	Wt (g)	Wt (g)	Egg Count	Egg Count	t Count	Ovary	Specimen	Egg Coun	t (%)	Egg Count	(%)	Egg Cou	nt (%)	Egg Count	(%)	Count	Count	Count	(%)	Count	(%)	Count (%	
	F001 (A) F002 (N)	A	50.330	0.362	0.267	0.629		1.250	N	0.047	0.092	118	59	177	1273	801	0	0.00	177	#####	0	0.00	0	0.00								
	N Mean		1 50.33	1 0.36	1 0.27	1 0.63		1 1.25		1 0.05	1 0.09	1 118.00	1 59.00	1 177.00	1 1273.38	1 800.96	1 0.00	1 0.00	1 177.00	1 #####	1 0.00	1 0.00	1 0.00	1 0.00								
	SD SEM																															
Site 32 (W-9a)		A	69.570	1.567	1.869	3.436		4.939	N	0.286	0.258	1128	921	2049	3767	12942	0	0.00	2049	#####	0	0.00	0	0.00		N/A						_
4.3 mg/Kg Sediment PCB	F002 (A) F003 (N) F005 (A)	A A A	38.208 43.360 54.614	0.462	0.602	1.064		2.454	N	0.094	0.087	216	235	451	2492	2651	4	0.90	442	99.10	5	1.11	0	0.00								
	F006 (N) F007 (F)	J A	14.747 52.196	0.044 0.936	0.037 1.276	0.081 2.212		0.549 4.238	N N	Counts n 0.237	ot possibl 0.201	e for stage I 675	oocytes. 538	1213	2769	6126	All oocyte	es are Sta 0.00	ge I 1210	#####	3	0.25	0	0.00	Ovary Sli	des were m N/A	ade.					
	N Mean		5 51.59	3 0.99	3 1.25	3 2.24		3 3.88		3 0.21	3 0.18	3 673.00	3 564.67	3 ######	3 3009.22	3 7239.65	3 1.33	3 0.30	3 1233.67	3 99.70	3 2.67	3 0.45	3 0.00	3 0.00								
	SD SEM		12.04 5.38	0.55 0.32	0.63 0.37	1.19		1.28 0.74		0.10 0.06	0.09 0.05	456.00 263.27	343.78 198.48	799.29	670.40 387.05	5234.95 3022.40	2.31 1.33	0.52 0.30	803.76 464.05	0.52 0.30	2.52 1.45	0.58 0.34	0.00	0.00								
Site 33 (W-8)	F002 (N)	J	9.155	0.022	0.019	0.041		0.448	N	Counts n	ot possibl	e for stage I	oocvtes.				All oocyte	es are Sta	ae I.						Ovarv Sli	des were m	ade.					_
120.0 mg/Kg Sediment PCB		A J	61.460 11.949	0.036	0.041	0.077		0.644				e for stage I					All oocyte															
	F005 (N) F006 (N) F007 (A)	J A A	17.188 39.433 57.100	0.050 1.114	0.050 0.870	0.100 1.984		0.582 5.031	N N		ot possibl 0.070	e for stage I 162	oocytes. 145	307	1785	3541	All oocyte 0	o.00	ge I. 306	#####	1	0.33	0	0.00	Ovary Sli	des were m	ade.					
	F008 (N)	J	17.977	0.070	0.072	0.142		0.790	N	Counts n	ot possibl	e for stage I	oocytes.				All oocyte	es are Sta	ge I.						Ovary Sli	des were m	ade.					
	N Mean SD SEM		3 52.66 11.66 6.73	1 1.11	1 0.87	1 1.98		1 5.03		1 0.10	1 0.07	1 162.00	1 145.00	1 307.00	1 1784.88	1 3541.21	1 0.00	1 0.00	1 306.00	1 #####	1 1.00	1 0.33	1 0.00	1 0.00								
Site 34 (W-7a)		A	62.030 57.150	6.340 12.160	8.560 0.000	#####		24.021 21.277	Y Y	14.900 12.160	0.000	4398 2754	0	4398 2754	295 226	4398 2754	4398 2754	#####	0	0.00	0	0.00	348 186	7.91 6.75		4398 2754	0	0.00	0	0.00	0 0.0 0 0.0	
18.0 mg/Kg Sediment PCB	F002 (F) F003 (F) ² F004 (A)	A A A	51.013 47.068	0.391	0.313	0.704	10.500	21.963	Y	0.066	0.000	128	247	375	2404	1692	0	0.00	375	#####	0	0.00	0	0.00	(1878) ³	N/A	U	0.00	U	0.00	0 0.0	U
	F005 (F) F006 (F) F007 (A)	A A A	70.570 49.370 29.840	16.190 8.170	0.000 0.000	##### 8.170		22.942 16.549	Y	16.190 8.170	0.000 0.000	4435 2630	0	4435 2630	274 322	4435 2630	4435 2630	##### #####	0	0.00 0.00	0	0.00 0.00	236 116	5.32 4.41		4435 2630	0	0.00 0.00	0	0.00 0.00	0 0.0 0 0.0	
	N Mean		7 52.43	5 8.65	5 1.77	5 10.42	1 10.50	5 21.35		5 10.30	5 0.02	5 2869.00	5 49.40	5 ######	5 704.27	5 3181.86	5 2843.40	5 80.00	5 75.00	5 20.00	5 0.00	5 0.00	5 177.20	5 4.88	1 1878.00	4 3554.25	4 0.00	4 0.00	4 0.00	4 0.00	4 4 0.00 0.0	
	SD SEM		12.87 4.86	5.98 2.67	3.80 1.70	6.24 2.79	10.50	2.88 1.29		6.49 2.90	0.04 0.02	1758.81 786.56	110.46 49.40	######		1199.56 536.46	1808.90 808.96	44.72	167.71 75.00	44.72 20.00	0.00	0.00	130.24 58.25	3.04 1.36	1070.00	997.04 498.52	0.00	0.00 0.00	0.00	0.00 0.00	0.00 0.0 0.00 0.0	00
Site 35 (W-6)	F001 (F)	A	52.780	0.967	0.856	1.823		3.454	N	0.242	0.229	1513	1599	3112	6607	12045	0	0.00	3111	#####	1	0.03	0	0.00		N/A						_
42.0 mg/Kg Sediment PCB	F002 (F) F003 (N)	A A	62.330 60.240	1.329 2.249	1.025 2.654	2.354 4.903		3.777 8.139	N Y	0.277 0.140	0.411 0.127	1178 972	1723 764	2901 1736	4217 6502	9926 31879	0 104	0.00 5.99	2898 1632	##### 94.01	3	0.10	0	0.00 0.29		N/A						
	F004 (F) F005 (N) F006 (A) F007 (A)	A A A	62.180 67.350 30.690 65.890	1.302 1.402	0.848 1.565	2.150 2.967		3.458 4.405	N Y	0.144 0.114	0.390 0.092	1415 760	1573 508	2988 1268	5596 6155	12030 18263	0 81	0.00 6.39	2986 1186	##### 93.61	1	0.07 0.08	0	0.00		N/A						
	N	-	7	5	5	5		5		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5								
	Mean SD SEM		57.35 12.66 4.78	1.45 0.48 0.21	1.39 0.76 0.34	2.84 1.23 0.55		4.65 1.99 0.89		0.18 0.07 0.03	0.25 0.15 0.07	1167.60 310.25 138.75	1233.40 555.71 248.52	840.54	977.04	16828.54 8973.81 4013.21	37.00 51.31 22.95	2.48 3.39 1.52	2362.60 887.91 397.09	97.52 3.39 1.52	1.40 1.14 0.51	0.06 0.04 0.02	1.00 2.24 1.00	0.06 0.13 0.06								

		Assesse	1					Total								Ovary Sect	ions											Stripped E				
Spicimen	Specimen	(Adult/ Juvenile		Rt Ovary Wt (g)	Lt Ovary Wt (g)	Total Ovary Wt (g)	Stripped Egg Mass Wt (a)	Ovary Wt (as % Body Wt)	Gravid		Lt Ovary Section Wt (g)	Right Section	Left Section	Total Egg Count	Oocytes Per Gram	Oocytes per	≥ Stage II		< Stage III		Necrotic C		Stage VI (Stripped Egg Count	Attempted Egg Fert. Count	Fertil Egg Count	ized (%)	Normal A Egg Count	ppearing	Egg	ned (%)
Site 36 (W-4) 0.46 mg/Kg Sediment PCB	F001 (F) F002 (F)	A A A A	57.117 46.035 33.468 36.410		1.702 1.782	3.412	WL (g)	5.974 6.486	Y Y	0.500 2.986	0.404 0.000	610 960	506 0	1116 960	1235 322	4212 960	860 638	77.20 67.30	254 322	22.80 33.97	2 12	0.18 1.25	20 25	1.80 2.64	0	N/A 600		1107		89.80	Count 0	0.00
	N Mean SD SEM		4 43.26 10.69 5.34	2 1.46 0.36 0.25	2 1.74 0.06 0.04	2 3.20 0.30 0.21		2 6.23 0.36 0.26		2 1.74 1.76 1.24	2 0.20 0.29 0.20	2 785.00 247.49 175.00	2 253.00 357.80 253.00	2 ###### 110.31 78.00	2 778.01 645.60 456.51	2 2586.08 2299.62 1626.08	2 749.00 156.98 111.00	2 72.25 7.00 4.95	2 288.00 48.08 34.00	2 28.38 7.90 5.58	2 7.00 7.07 5.00	2 0.71 0.76 0.54	2 22.50 3.54 2.50	2 2.22 0.60 0.42	1 0.00	1 600.00	1 304.00	1 50.67	1 273.00	1 89.80	1 0.00	1 0.00
Site 37 (EW-3) 30.0 mg/Kg Sediment PCB	F002 (F) F003 (F) F004 (N) F005 (N) F006-D00 F007 (A)	Α	56.840	4.177 2.296 5.015 0.073 0.038 RRIVED	2.848 1.737 6.310 0.088 0.022 DEAD	7.025 4.033 ##### 0.161 0.060		13.981 6.957 18.180 1.232 0.585				334 772 279 e for stage I e for stage I		720 1642 279	661 1635 344	4640 6596 3891	267 0 162 All oocyte All oocyte			61.86 ##### 41.94	20 2 0	2.78 0.12 0.00	18 8 0	2.57 0.49 0.00		N/A N/A 279 des were ma		0.00	0	0.00	0	0.00
	F008 (A) F009 (N)	A J	51.320 12.789	0.079	0.082	0.161		1.259	N	Counts n	ot possible	e for stage I	oocytes.				All oocyte	s are Stag	ge I.													
	N Mean SD SEM		5 55.73 4.97 2.22	3 3.83 1.39 0.80	3 3.63 2.39 1.38	3 7.46 3.67 2.12		3 13.04 5.67 3.27		3 0.63 0.17 0.10	3 0.34 0.29 0.17	3 461.67 270.16 155.98	3 418.67 435.92 251.68	3 880.33 695.50 401.55	3 879.87 673.28 388.72	3 5042.47 1396.40 806.21	3 143.00 134.51 77.66	3 32.07 29.50 17.03	3 730.00 803.77 464.05	3 67.93 29.50 17.03	3 7.33 11.02 6.36	3 0.97 1.57 0.91	3 8.67 9.02 5.21	3 1.02 1.37 0.79		1 279.00	1 0.00	1 0.00	1 0.00	1 0.00	1 0.00	1 0.00
Site 38 (E-1) 160.0 mg/Kg	F001 (F) F002 (F)	A	37.990 45.830	0.507 1.197	0.623 0.842	1.130 2.039		2.974 4.449	N N	0.111 0.220	0.138 0.283	442 892	476 1170	918 2062	3687 4099	4166 8359	0	0.00	918 1999	##### 96.94	1 0	0.11 0.00	0	0.00		N/A N/A						
Sediment PCB	F003 (A) F004 (N) F005 (A)	A A A	42.080 22.452 30.938	0.213	0.261	0.474		2.111	N	0.064	0.052	171	154	325	2802	1328	0	0.00	325	#####	0	0.00	0	0.00	Ovary Slice	les were m	ade.					
	F007 (F)	Ä	48.170	0.680	0.830	1.510		3.135	N	0.177	0.206	721	646	1367	3569	5389	0	0.00	1367	#####	0	0.00	0	0.00		N/A						
	N Mean SD SEM		6 37.91 9.73 3.97	4 0.65 0.41 0.21	4 0.64 0.27 0.14	4 1.29 0.66 0.33		4 3.17 0.97 0.48		4 0.14 0.07 0.03	4 0.17 0.10 0.05	4 556.50 316.93 158.47	4 611.50 424.57 212.28	4 ##### 733.03 366.51	4 3539.27 541.72 270.86	4 4810.55 2913.64 1456.82	4 0.00 0.00 0.00	4 0.00 0.00 0.00	4 1152.25 707.65 353.83	4 99.26 1.55 0.77	4 0.25 0.50 0.25	4 0.03 0.05 0.03	4 0.00 0.00 0.00	4 0.00 0.00 0.00								
Site 39 (W-1) 0.15 mg/Kg Sediment PCB	F001 (F) F002 (F) F003 (A) F004 (A)	A A A	76.560 47.270 50.370 46.600	5.602 1.293	4.813 0.844	##### 2.137		13.604 4.521	Y N	0.907 0.211	0.986 0.289	590 1076	769 1129	1359 2205	718 4410	7477 9424	819 0	60.58 0.00	533 2201	39.42 #####	7 4	0.52 0.18	24 0	1.78 0.00		1352 N/A	0	0.00	0	0.00	0	0.00
	F005 (A) F006 (N) F007 (N) F008 (N) F009 (N) F010 (N)	A J J A A	35.400 45.811 9.860 17.680 43.207 45.441	0.295 0.051 0.097 0.298 0.602	0.352 0.045 0.108 0.289 0.265	0.647 0.096 0.205 0.587 0.867		1.412 0.974 1.160 1.359 1.908	N N N N	Counts n	ot possible	e for stage I e for stage I e for stage I 68 142	oocytes.	156 310	2889 2672	1696 2317	All oocyte All oocyte Oocytes a 0 0	s are Stag		Stage II. #####	0	0.00 0.00	0	0.00 0.00		les were mi						
	N Mean SD SEM		8 48.83 18.28 6.46	5 1.62 2.00 0.89	5 1.31 1.72 0.77	5 2.93 3.71 1.66		5 4.56 4.59 2.05		4 0.30 0.41 0.21	4 0.34 0.45 0.22	4 469.00 465.77 232.88	4 538.50 497.34 248.67		4 2672.30 1515.05 757.53	4 5228.49 3812.98 1906.49	4 204.75 409.50 204.75	4 15.14 30.29 15.14	4 800.00 946.74 473.37	4 84.86 30.29 15.14	4 2.75 3.40 1.70	4 0.17 0.24 0.12	4 6.00 12.00 6.00	4 0.44 0.89 0.44	0	1 1352.00	1 0.00	1 0.00	1 0.00	1 0.00	1 0.00	1 0.00
R1 Reference	F001 (F) F002 (A)	A	76.000 70.900	3.650	0.000	3.650	21.130	32.605	Y	3.650	0.000	711	0	711	195	711	711	#####	0	0.00	0	0.00	438	61.60	2674	1734	1090	62.86	1052	96.51	145	13.30
	F003 (F) F004 (A) F005 (F)	A A A	71.360 83.430 79.740	10.159	11.754 3.250	##### 5.810	0.000 14.469	30.708 25.431	Y	1.992 0.648	2.470 0.757	994 875	1188 999	2182 1874	489 1334	10716 7749	1690 572	77.45 30.52	492 1302	22.55 69.48	0	0.00	1320 416	60.49	2866	N/A 519	367	70.71	257	97.28	294	80.11
	F006 (N)	A	83.000	14.685	13.854	#####	0.000	34.384	Ϋ́Υ	0.865	0.757	134	155	289	156	4465	289	#####	0	0.00	0	0.00	239	82.70	2000	อเช	301	10.71	301	31.20	294	00.11
	N Mean SD SEM		6 77.41 5.55 2.26	4 7.76 5.71 2.85	7.21 6.64 3.32	4 14.98 12.17 6.09	4 8.90 10.63 5.32	4 30.78 3.87 1.94		4 1.79 1.37 0.69	4 1.05 1.03 0.52	4 678.50 381.09 190.55	4 585.50 595.02 297.51	4 ##### 907.61 453.80	4 543.52 547.40 273.70	4 5910.44 4304.88 2152.44	4 815.50 608.87 304.43	4 76.99 32.75 16.38	4 448.50 614.45 307.23	4 23.01 32.75 16.38	4 0.00 0.00 0.00	4 0.00 0.00 0.00	4 603.25 486.07 243.03	25.20	2 2770.00 135.76 96.00	2 1126.50 859.13 607.50	2 728.50 511.24 361.50	5.55	491.44	0.54	2 219.50 105.36 74.50	47.24

		Assessed	ı					Total								Ovary Sect	ions										8	Stripped E	ggs			
		Maturity ¹				Total	Stripped	Ovary Wt		Rt Ovary		Right	Left	Total	Oocytes	Oocytes									Stripped	Attempted	Fertil	ized	Normal A	ppearing	Hatc	hed
Spicimen Location		(Adult/ Juvenile)		Rt Ovary Wt (q)			Egg Mass Wt (q)	(as % Body Wt)		Section Wt (g)	Section Wt (g)	Section Egg Count	Section Egg Count	Egg	Per Gram Ovarv	per Specimen			< Stage III						Egg Count	Egg Fert. Count	Egg	(%)	Egg	(%)	Egg Count	(9/.)
R2 Reference	F007 (A) F008 (A) F009 (F) F010 (F) F011 (F) F012 (F)	A A A A A	76.600 74.410 108.670 65.100 80.080		11.544 8.580 5.490	##### #####	2.518 0.000 0.000 0.000	21.669 30.261 16.613 24.720	Y Y Y Y			e due to fert 956 727 2299		1899 2182 4352	493 737 1050	9717 9807 18452	1512 1628 2710	79.62 74.64 62.27	387 553 1642	20.38 25.36 37.73	0 1 0	0.00 0.05 0.00	1394 1366 2598	73.41 62.63 59.70	822 N/A N/A	822 1899	0	0.00	0 0	0.00	0 0	0.00
	N Mean SD SEM		6 79.32 15.26 6.23	4 9.54 1.36 0.68	4 8.36 2.50 1.25	4 17.90 3.38 1.69	4 0.63 1.26 0.63	4 23.32 5.71 2.86		3 1.74 0.63 0.37	3 1.92 0.02 0.01	3 1327.33 849.24 490.31	3 1483.67 555.55 320.75	3 ###### ###### 774.82	3 760.29 279.32 161.26	3 12658.77 5017.41 2896.80	3 1950.00 660.73 381.47	8.93	3 860.67 681.73 393.59	3 27.82 8.93 5.16	3 0.33 0.58 0.33	3 0.02 0.03 0.02	3 1786.00 703.35 406.08	7.22	1 822.00	2 1360.50 761.55 538.50	2 0.00	2 0.00	2 0.00	2 0.00	2 0.00	0.00
R3 Reference	F001 (F) F002 (F) F003 (F) F004 (A)	A A A	68.911 95.197 76.197 74.889	20.437 9.234 10.324	0.000 7.982 9.081	##### ##### #####	1.024 12.648 10.559	31.143 31.371 39.324	Y Y Y	0.222 0.318 0.604	0.588 0.185 0.268	41 66 128	104 35 59	145 101 187	179 201 214	3658 3457 4161	145 101 187	##### ##### #####	0 0 0	0.00 0.00 0.00	0 0 0	0.00 0.00 0.00	138 92 148	95.17 91.09 79.14	361 3000 3000	N/A 1614 648		96.28 97.69	1554 633	100.00 100.00		59.33 85.47
	F005 (F) F006 (F)	A	58.781 82.630	9.737 8.402	0.000 0.000	9.737 8.402	4.606 20.055	24.401 34.439	Y	0.135 0.249	0.213 0.308	20 58	36 50	56 108	161 194	1567 1629	56 108	##### #####	0	0.00 0.00	0	0.00 0.00	50 100	89.29 92.59	3000 5000	1762 1306		99.60 94.72		100.00 100.00	1345 542	76.64 43.82
	N Mean SD SEM		6 76.10 12.33 5.03	5 11.63 4.98 2.23	5 3.41 4.69 2.10	5 15.04 5.59 2.50	5 9.78 7.38 3.30	5 32.14 5.44 2.43		5 0.31 0.18 0.08	5 0.31 0.16 0.07	5 62.60 40.59 18.15	5 56.80 28.23 12.62	5 119.40 49.28 22.04	5 189.81 20.59 9.21	5 2894.55 1211.28 541.70	5 119.40 49.28 22.04	5 ##### 0.00 0.00	5 0.00 0.00 0.00	5 0.00 0.00 0.00	5 0.00 0.00 0.00	5 0.00 0.00 0.00	5 105.60 39.23 17.54	5 89.46 6.16 2.75	5 2872.20 1649.44 737.65	494.29	4 ##### 490.00 245.00	2.08	490.00	0.00	4 837.50 382.94 191.47	18.51
R1, R2, R3 Pooled	F001 (F) F002 (A)	A	76.000 70.900	3.650	0.000	3.650	21.130	32.605	Υ	3.650	0.000	711	0	711	195	711	711	#####	0	0.00	0	0.00	438	61.60	2674	1734	1090	62.86	1052	96.51	145	13.30
References	F003 (F) F004 (A)	A	71.360 83.430	10.159			0.000	30.708	Υ	1.992	2.470	994	1188	2182	489	10716	1690	77.45	492	22.55	0	0.00	1320	60.49		N/A						
	F005 (F) F006 (N) F007 (A)	A A A	79.740 83.000 76.600	2.560 14.685		5.810 #####	14.469 0.000	25.431 34.384	Y	0.648 0.865	0.757 0.982	875 134	999 155	1874 289	1334 156	7749 4465	572 289	30.52 #####	1302 0	69.48 0.00	0	0.00	416 239	22.20 82.70	2866	519	367	70.71	357	97.28	294	80.11
	F008 (A) F009 (F) F010 (F) F011 (F) F012 (F) F001 (F) F002 (F) F003 (F) F004 (A) F005 (F) F006 (F)	A A A A A A A A A	74.410 108.670 65.100 80.080 71.060 68.911 95.197 76.197 74.889 58.781 82.630	9.486 11.120 7.814 9.748 20.437 9.234 10.324 9.737 8.402	11.544 8.580 5.490 7.818 0.000 7.982 9.081 0.000 0.000	##### ##### ##### 9.737	2.518 0.000 0.000 0.000 1.024 12.648 10.559 4.606 20.055	21.669 30.261 16.613 24.720 31.143 31.371 39.324 24.401 34.439	Y Y Y Y Y Y	Counts no 1.925 1.027 2.253 0.222 0.318 0.604 0.135 0.249	1.925 1.933 1.890 0.588 0.185 0.268 0.213 0.308	e due to fert 956 727 2299 41 66 128 20 58	ilization 943 1455 2053 104 35 59 36 50	1899 2182 4352 145 101 187 56 108	493 737 1050 179 201 214 161 194	9717 9807 18452 3658 3457 4161 1567 1629	1512 1628 2710 145 101 187 56 108	79.62 74.64 62.27 #### ##### #####	387 553 1642 0 0 0	20.38 25.36 37.73 0.00 0.00 0.00 0.00	0 1 0 0 0 0	0.00 0.05 0.00 0.00 0.00 0.00	1394 1366 2598 138 92 148 50	73.41 62.63 59.70 95.17 91.09 79.14 89.29 92.59	822 N/A N/A 361 3000 3000 3000 5000	822 1899 N/A 1614 648 1762 1306	633 1755	0.00 0.00 96.28 97.69 99.60 94.72	633 1755	0.00 0.00 100.00 100.00 100.00 100.00	541 1345	0.00 0.00 59.33 85.47 76.64 43.82
	N Mean SD SEM		18 77.61 11.14 2.63	13 9.80 4.43 1.23	13 6.10 5.00 1.39	13 15.90 7.23 2.00	13 6.69 8.04 2.23	13 29.01 6.14 1.70		12 1.16 1.08 0.31	12 0.96 0.86 0.25	12 584.08 669.96 193.40	12 589.75 707.11 204.13	12 ###### ##### 386.47	12 450.33 395.31 114.12	12 6340.90 5149.47 1486.52	12 809.08 867.52 250.43		12 364.67 563.53 162.68	12 14.62 21.85 6.31	12 0.08 0.29 0.08	12 0.00 0.01 0.00	12 691.58 800.32 231.03		8 2590.38 1438.74 508.67	8 1288.00 550.54 194.64		42.45	679.78	8 74.22 45.83 16.20		36.12

¹ If a female weighed > 20g and/or showed signs of gravidity (oocytes > stage III), it was assessed as an adult. Juveniles were excluded from any analysis, including descriptive statistics ² Stripped Egg Mass Weight is estimated value.

³ Laid prematurely during culture.

⁽A) Analytical Specimen (N) Necropsy Specimen (F) Fertilization Specimen

HOUSATONIC RIVER PROJECT RANA pipiens REPRODUCTION STUDY 2000 SPERM HEAD/DYSMORPHOLOGY DAT/

			Right		Total	Sperm Counts			Sperm		Total Dys	morphology Co	ounts		
Specimen Location	Specimen ID	Body Wt. (g)	Testis Wt. (g)	Chamber 1	Chamber 2	Chamber 3	Chamber 4	Mean Count	Heads/g Tissue ¹	Chamber 1	Chamber 2	Chamber 2 Chamber 3	Chamber 4	Mean Count	Abnormal (%)
Site 32 (W-9a)	M001	41.31	0.023	14	29	10	19	18.00	1.96E+06	2	2	0	3	1.75	9.722
4.3 mg/Kg	M002	44.70	0.022	30	39	21	25	28.75	3.27E+06	4	4	1	1	2.50	8.696
Sediment PCB	M003	33.78	0.026	35	28	27	36	31.50	3.03E+06	2	2	1	1	1.50	4.762
	M004	43.00	0.031	16	20	18	17	17.75	1.43E+06	2	2	1	2	1.75	9.859
	Mean:	40.70	0.026					24.00	2.42E+06					1.88	8.260
Site 33 (W-8)	M001	21.52	0.012	3	4	2	7	4.00	8.33E+05	1	2	2	2	1.75	43.750
120.0 mg/Kg	M002	43.99	0.022	4	4	6	4	4.50	5.11E+05	2	1	3	2	2.00	44.444
Sediment PCB	M006	39.01	0.013	1	4	4	1	2.50	4.81E+05	1	1	1	1	1.00	40.000
	Mean:	34.84	0.016					3.67	6.08E+05					1.58	42.731
Site 34 (W-7a)	M001	34.98	0.029	14	15	18		15.67	1.35E+06	3	3	2		2.67	17.021
18.0 mg/Kg	M002	40.19	0.017	24	27	30		27.00	3.97E+06	4	1	5		3.33	12.346
Sediment PCB	M003	33.45	0.017	22	25	22		23.00	3.38E+06	3	2	4		3.00	13.043
	M004	28.22	0.011	23	23	25		23.67	5.38E+06	1	2	1		1.33	5.634
	Mean:	34.21	0.019					22.33	3.52E+06					2.58	12.011
Site 35 (W-6)	M001	43.74	0.031	17	13	14	20	16.00	1,29E+06	6	6	2	4	4.50	28.125
42.0 mg/Kg	M002	37.95	0.022	12	11	18	17	14.50	1.65E+06	7	5	4	8	6.00	41.379
Sediment PCB	M003	43.74	0.046	19	22	24	20	21.25	1.15E+06	8	8	11	8	8.75	41.176
	M004	32.77	0.014	27	13	25	23	22.00	3.93E+06	11	6	9	8	8.50	38.636
	Mean:		0.028					18.44	2.01E+06					6.94	37.329
Site 36 (W-4)	M004	37.22	0.031	60	43	60	59	55.50	4.48E+06	1	3	2	1	1.75	3.153
0.46 mg/Kg Sediment PCB	Mean:	37.22	0.031					55.50	4.48E+06					1.75	3.153
Site 37 (EW-3)	M001	25.55	0.014	6	5	8	3	5.50	9.82E+05	5	3	4	2	3.50	63.636
30.0 mg/Kg	M002	35.61	0.019	4	5	1	5	3.75	4.93E+05	3	3	0	1	1.75	46.667
Sediment PCB	M003	31.32	0.014	7	2	6	9	6.00	1.07E+06	2	2	2	3	2.25	37.500
	M005	33.13	0.025	7	5	5	7	6.00	6.00E+05	4	0	4	4	3.00	50.000
	Mean:	31.40	0.018					5.31	7.87E+05					2.63	49.451

HOUSATONIC RIVER PROJECT RANA pipiens REPRODUCTION STUDY 2000 SPERM HEAD/DYSMORPHOLOGY DAT/

			Right		Total	Sperm Counts			Sperm	Total Dysmorphology Counts					
Specimen Location	Specimen ID	Body Wt. (g)	. Testis Wt. (g)	Chamber 1	Chamber 2	Chamber 3	Chamber 4	Mean Count	Heads/g Tissue ¹	Chamber 1	Chamber 2	Chamber 3	Chamber 4	Mean Count	Abnormal (%)
Site 38 (E-1)	M001	41.55	0.042	37	35	32	30	33.50	1.99E+06	4	3	2	3	3.00	8.955
160.0 mg/Kg	M002	51.73	0.047	30	29	35	41	33.75	1.80E+06	5	4	5	5	4.75	14.074
Sediment PCB	M003	34.88	0.008	22	39	28	22	27.75	8.67E+06	9	6	4	3	5.50	19.820
	M007	37.56	0.010	19	23	26	24	23.00	5.75E+06	3	3	3	4	3.25	14.130
	Mean:	41.43	0.027					29.50	4.55E+06					4.13	14.245
Site 39 (W-1)	M002	42.47	0.023	51	54	56	47	52.00	5.65E+06	2	3	2	4	2.75	5.288
0.15 mg/Kg	M003	33.32	0.044	58	45	48	50	50.25	2.86E+06	2	4	1	1	2.00	3.980
Sediment PCB	M004	34.97	0.016	53	57	59	58	56.75	8.87E+06	3	2	2	1	2.00	3.524
	M006	35.17	0.046	55	48	64	54	55.25	3.00E+06	2	4	1	3	2.50	4.525
	Mean:	36.48	0.032					53.56	5.09E+06					2.31	4.329
R1	M001	43.06	0.041	71	70	72	81	73.50	4.48E+06	1	0	1	0	0.50	0.680
Reference	M004	48.31	0.045	69	69	74	82	73.50	4.08E+06	1	0	0	1	0.50	0.680
	M005	35.50	0.030	75	71	80	82	77.00	6.42E+06	0	0	1	0	0.25	0.325
	M006	35.40	0.032	76	82	91	86	83.75	6.54E+06	0	0	0	0	0.00	0.000
	Mean:	40.57	0.037					76.94	5.38E+06					0.31	0.421
R2	M009	35.66	0.038	52	48	55	53	52.00	3.42E+06	0	1	1	1	0.75	1.442
Reference	M011	41.89	0.010	48	57	66	63	58.50	1.46E+07	0	1	0	0	0.25	0.427
	M012	44.98	0.028	66	61	61	63	62.75	5.60E+06	1	1	0	0	0.50	0.797
	Mean:	40.84	0.025					57.75	7.88E+06					0.50	0.889
R3	M001	34.56	0.030	48	50	56	46	50.00	4.17E+06	1	2	0	1	1.00	2.000
Reference	M002	35.56	0.042	46	54	49	56	51.25	3.05E+06	1	3	0	2	1.50	2.927
	M003	37.46	0.032	43	45	53	44	46.25	3.61E+06	0	2	2	0	1.00	2.162
	Mean:	35.86	0.035					49.17	3.61E+06					1.17	2.363

HOUSATONIC RIVER PROJECT RANA pipiens REPRODUCTION STUDY 2000 SPERM HEAD/DYSMORPHOLOGY DAT/

			Right		Total	Sperm Counts			Sperm		Total Dys	morphology Co	ounts		
Specimen	Specimen	Body Wt.	Testis Wt.					Mean	Heads/g					Mean	Abnormal
Location	ID	(g)	(g)	Chamber 1	Chamber 2	Chamber 3	Chamber 4	Count	Tissue ¹	Chamber 1	Chamber 2	Chamber 3	Chamber 4	Count	(%)
R1, R2, R3	M001	43.06	0.041	71	70	72	81	73.50	4.48E+06	1	0	1	0	0.50	0.680
Pooled	M004	48.31	0.045	69	69	74	82	73.50	4.08E+06	1	0	0	1	0.50	0.680
References	M005	35.50	0.030	75	71	80	82	77.00	6.42E+06	0	0	1	0	0.25	0.325
	M006	35.40	0.032	76	82	91	86	83.75	6.54E+06	0	0	0	0	0.00	0.000
	M009	35.66	0.038	52	48	55	53	52.00	3.42E+06	0	1	1	1	0.75	1.442
	M011	41.89	0.010	48	57	66	63	58.50	1.46E+07	0	1	0	0	0.25	0.427
	M012	44.98	0.028	66	61	61	63	62.75	5.60E+06	1	1	0	0	0.50	0.797
	M001	34.56	0.030	48	50	56	46	50.00	4.17E+06	1	2	0	1	1.00	2.000
	M002	35.56	0.042	46	54	49	56	51.25	3.05E+06	1	3	0	2	1.50	2.927
	M003	37.46	0.032	43	45	53	44	46.25	3.61E+06	0	2	2	0	1.00	2.162
	Mean:	39.24	0.033					62.850	5.60E+06					0.63	1.144

¹[Mean Sperm Count]X[5(Square Factor)]X[104(Hemacytometer Factor)]X[5(Dilution Factor)]/Testis W

Specimen Location	Specimen ID	Body Wt (g)	Rt Testis Wt (g)	Lt Testis Wt (g)	Testes Wt (as % Body Wt)	Sperm Heads (X 10 ⁶)/g Tissue ¹	Abnormal (%)
Site 32 (W-9a)	M001 (F)	41.306	0.023	0.033	0.136	1.96E+06	9.722
4.3 mg/Kg	M001 (F)	44.700	0.022	0.033	0.123	3.27E+06	8.696
Sediment PCB	M003 (F)	33.775	0.026	0.033	0.175	3.03E+06	4.762
	M004 (F)	42.998	0.031	0.036	0.156	1.43E+06	9.859
	M005 (A)	30.535					
	M006 (A)	32.545					
	M007 (N)	36.320	0.022	0.016	0.105		
	N	7	5	5	5	4	4
	Mean	37.454	0.025	0.030	0.139	2.42E+06	8.260
	SD	5.551	0.004	0.008	0.027	8.72E+05	2.389
	SEM	2.098	0.002	0.004	0.012	4.36E+05	1.194
Site 33 (W-8)	M001 (N)	21.517	0.012	0.007	0.088	8.33E+05	43.750
120.0 mg/Kg	M001 (N)	43.988	0.012	0.007	0.100	5.11E+05	44.444
Sediment PCB	M003 (A)	43.890	0.022	0.022	0.100	0.112.00	
	M004 (A)	42.580					
	M005 (N)	40.007	0.007	0.012	0.047		
	M006 (N)	39.014	0.013	0.018	0.079	4.81E+05	40.000
	N	6	4	4	4	3	3
	Mean	38.499	0.014	0.015	0.079	6.08E+05	42.731
	SD	8.565	0.006	0.007	0.023	1.95E+05	2.391
	SEM	3.497	0.003	0.003	0.011	1.13E+05	1.380
Site 34 (W-7a)	M001 (F)	34.980	0.029	0.028	0.163	1.35E+06	17.021
18.0 mg/Kg	M001 (F)	40.190	0.017	0.017	0.085	3.97E+06	12.346
Sediment PCB	M003 (F)	33.450	0.017	0.017	0.102	3.38E+06	13.043
	M004 (F)	28.220	0.011	0.010	0.074	5.38E+06	5.634
	M005 (N)	17.324	0.005	0.005	0.058		
	N	5	5	5	5	4	4
	Mean	30.833	0.016	0.015	0.096	3.52E+06	12.011
	SD	8.674	0.009	0.009	0.041	1.67E+06	4.724
	SEM	3.879	0.004	0.004	0.018	8.36E+05	2.362
Site 35 (W-6)	M001 (F)	43.740	0.031	0.037	0.155	1.29E+06	28.125
42.0 mg/Kg	M002 (F)	37.950	0.022	0.012	0.090	1.65E+06	41.379
Sediment PCB	M003 (F)	43.740	0.046	0.047	0.213	1.15E+06	41.176
	M004 (F)	32.770	0.014	0.017	0.095	3.93E+06	38.636
	M005 (A)	31.570					
	M006 (A)	37.590					
	N	6	4	4	4	4	4
	Mean	37.893	0.028	0.028	0.138	2.01E+06	37.329
	SD	5.190	0.014	0.017	0.058	1.30E+06	6.262
	SEM	2.119	0.007	0.008	0.029	6.49E+05	3.131

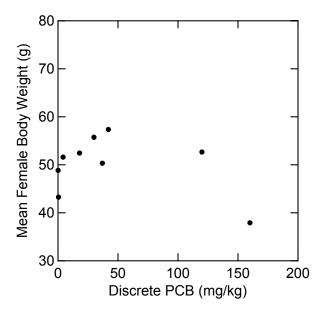
Specimen Location	Specimen ID	Body Wt (g)	Rt Testis Wt (g)	Lt Testis Wt (g)	Testes Wt (as % Body Wt)	Sperm Heads (X 10 ⁶)/g Tissue ¹	Abnormal (%)
Site 36 (W-4)	M001 (N)	13.623	0.004	0.003	0.051		
0.46 mg/Kg	M001 (A)	34.704	0.004	0.000	0.001		
Sediment PCB	M003 (N)	13.156	0.008	0.007	0.114		
	M004 (F)	37.222	0.031	0.021	0.140	4.48E+06	3.153
	M005 (N)	11.936	0.003	0.003	0.050		000
	N	5	4	4	4	1	1
	Mean	22.128	0.012	0.009	0.089	4.48E+06	3.153
	SD	12.676	0.013	0.009	0.045		
	SEM	5.669	0.007	0.004	0.023		
Sito 27 (EW 2)	M001 (F)	25.545	0.014	0.013	0.106	9.82E+05	63.636
Site 37 (EW-3)	M001 (F)	35.605	0.014	0.013	0.100	4.93E+05	46.667
30.0 mg/Kg Sediment PCB	M002 (F)	31.320	0.019	0.019	0.107	4.93E+05 1.07E+06	37.500
Sealment PCB	M003 (F)	23.070	0.014	0.013	0.000	1.07 E+00	37.300
	M004 (A)	33.132	0.025	0.024	0.148	6.00E+05	50.000
	M005 (F)	33.680	0.025	0.024	0.146	0.00E+03	30.000
	M008 (N)	10.425	0.006	0.006	0.115		
	N	7	5	5	5	4	4
	Mean	27.540	0.016	0.015	0.112	7.87E+05	49.451
	SD	8.805	0.018	0.013	0.112	2.83E+05	10.834
	_						
	SEM	3.328	0.003	0.003	0.010	1.41E+05	5.417
Site 38 (E-1)	M001 (F)	41.550	0.042	0.037	0.190	1.99E+06	8.955
160.0 mg/Kg	M002 (F)	51.730	0.047	0.038	0.164	1.80E+06	14.074
Sediment PCB	M003 (F)	34.880	0.008	0.007	0.043	8.67E+06	19.820
	M004 (N)	11.814	0.007	0.007	0.119		
	M005 (A)	39.680					
	M006 (A)	28.240					
	M007 (F) ²	37.560	0.010	0.010	0.053	2.88E+06	14.130
	M008 (N)	14.348	0.003	0.003	0.042		
	N	8	6	6	6	4	4
	Mean	32.475	0.020	0.017	0.102	3.83E+06	14.245
	SD	13.680	0.020	0.016	0.065	3.26E+06	4.439
	SEM	4.837	0.008	0.007	0.027	1.63E+06	2.219
Site 39 (W-1)	M001 (A)	50.600					
0.15 mg/Kg	M001 (A)	42.470	0.023	0.037	0.141	5.65E+06	5.288
Sediment PCB	M002 (F)	33.320	0.023	0.024	0.204	2.73E+06	3.980
Jeannent FOB	M003 (F)	34.970	0.044	0.024	0.204	8.87E+06	3.524
	M004 (1)	28.370	0.010	0.020	0.112	0.07 E · 00	0.024
	M005 (A)	35.170	0.046	0.022	0.193	3.00E+06	4.525
	M007 (A)	19.240	3.3.10	3.322	3.700	3.332.33	
	N	7	4	4	4	4	4
	Mean	34.877	0.032	0.027	0.163	5.06E+06	4.329
	CD	0.050	0.045	0.007	0.044	2 005 100	0.750
	SD	9.952	0.015	0.007	0.044	2.86E+06	0.759

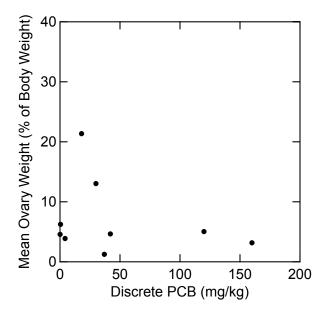
Specimen Location	Specimen ID	Body Wt (g)	Rt Testis Wt (g)	Lt Testis Wt (g)	Testes Wt (as % Body Wt)	Sperm Heads (X 10 ⁶)/g Tissue ¹	Abnormal (%)
R1	M001 (F)	43.060	0.041	0.040	0.188	4.48E+06	0.680
Reference	M002 (A)	24.260					
	M003 (A)	35.950					
	M004 (F)	48.310	0.045	0.043	0.182	4.08E+06	0.680
	M005 (F)	35.500	0.030	0.034	0.180	6.42E+06	0.325
	M006 (F)	35.400	0.032	0.022	0.153	6.54E+06	0.000
	N	6	4	4	4	4	4
	Mean	37.080	0.037	0.035	0.176	5.38E+06	0.421
	SD	8.159	0.007	0.009	0.016	1.28E+06	0.327
	SEM	3.331	0.004	0.005	0.008	6.40E+05	0.164
R2	M007 (A)	31.860					
Reference	M008 (A)	41.400					
	M009 (F)	35.660	0.038	0.037	0.210	3.42E+06	1.442
	M010 (F)	29.580	0.000	0.014	0.047		
	M011 (F)	41.890	0.010	0.009	0.045	1.46E+07	0.427
	M012 (F)	44.980	0.028	0.027	0.122	5.60E+06	0.797
	N	6	4	4	4	3	3
	Mean	37.562	0.019	0.022	0.106	7.88E+06	0.889
	SD	6.137	0.017	0.013	0.078	5.94E+06	0.514
	SEM	2.506	0.009	0.006	0.039	3.43E+06	0.297
R3	M001 (F)	34.560	0.030	0.033	0.182	4.17E+06	2.000
Reference	M001 (F)	35.559	0.030	0.035	0.102	3.05E+06	2.927
Reference	M002 (F)	37.463	0.032	0.020	0.139	3.61E+06	2.162
	M004 (A)	27.057	0.002	0.020	0.100	0.012100	2.102
	M005 (F)	34.678	0.029	0.017	0.133		
	M006 (F)	33.637	0.007	0.006	0.039		
	N	6	5	5	5	3	3
	Mean	33.826	0.028	0.022	0.142	3.61E+06	2.363
	SD	3.560	0.013	0.012	0.067	5.58E+05	0.495
	SEM	1.453	0.006	0.005	0.030	3.22E+05	0.286

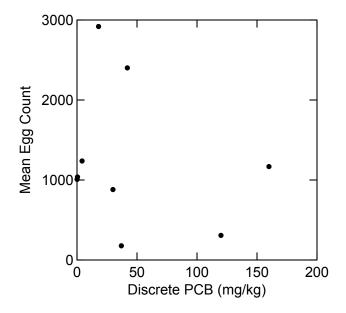
Specimen Location	Specimen ID	Body Wt (g)	Rt Testis Wt (g)	Lt Testis Wt (g)	Testes Wt (as % Body Wt)	Sperm Heads (X 10 ⁶)/g Tissue ¹	Abnormal (%)
R1, R2, R3	M001 (F)	43.060	0.041	0.040	0.188	4.48E+06	0.680
Pooled	M002 (A)	24.260					
References	M003 (A)	35.950					
	M004 (F)	48.310	0.045	0.043	0.182	4.08E+06	0.680
	M005 (F)	35.500	0.030	0.034	0.180	6.42E+06	0.325
	M006 (F)	35.400	0.032	0.022	0.153	6.54E+06	0.000
	M007 (A)	31.860					
	M008 (A)	41.400					
	M009 (F)	35.660	0.038	0.037	0.210	3.42E+06	1.442
	M010 (F)	29.580	0.000	0.014	0.047		
	M011 (F)	41.890	0.010	0.009	0.045	1.46E+07	0.427
	M012 (F)	44.980	0.028	0.027	0.122	5.60E+06	0.797
	M001 (F)	34.560	0.030	0.033	0.182	4.17E+06	2.000
	M002 (F)	35.559	0.042	0.035	0.217	3.05E+06	2.927
	M003 (F)	37.463	0.032	0.020	0.139	3.61E+06	2.162
	M004 (A)	27.057					
	M005 (F)	34.678	0.029	0.017	0.133		
	M006 (F)	33.637	0.007	0.006	0.039		
	,						
	N	18	13	13	13	10	10
	Mean	36.156	0.028	0.026	0.141	5.60E+06	1.144
	SD	6.107	0.014	0.012	0.062	3.40E+06	0.948
	SEM	1.439	0.004	0.003	0.017	1.07E+06	0.300
	J	1.700	0.00-	0.000	0.017	1.07 = . 00	0.000

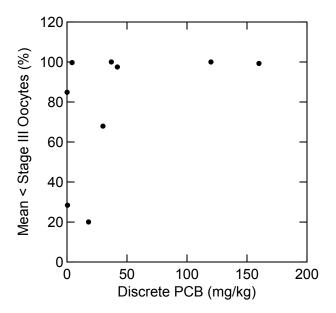
¹[Mean Sperm Count]X[5(Square Factor)]X[104(Hemacytometer Factor)]X[5(Dilution Factor)]/Testis \

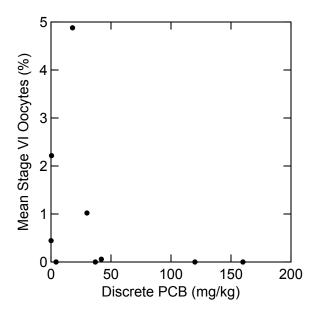
²Testes weights are estimated values

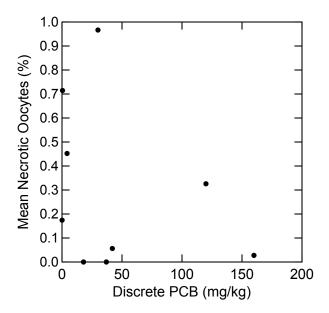


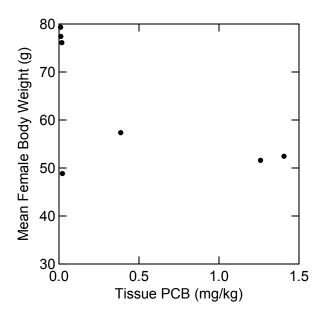


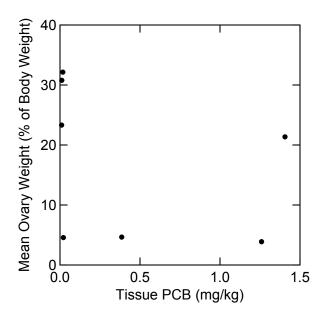


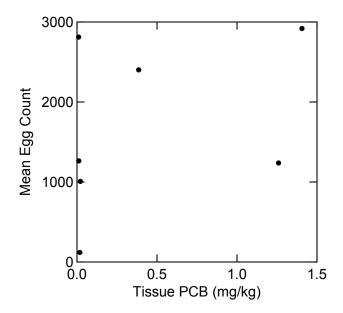


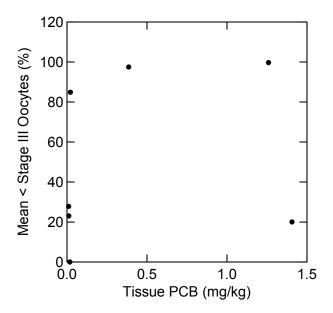


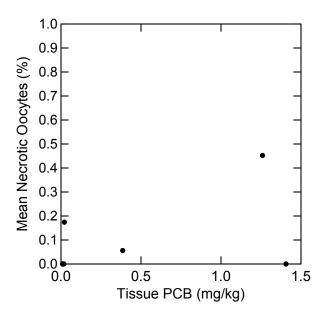


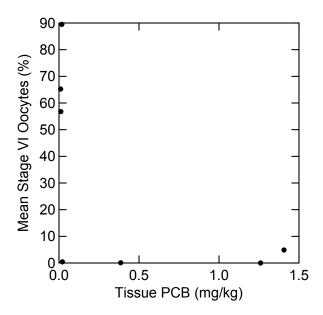


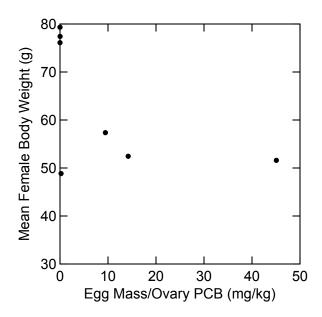


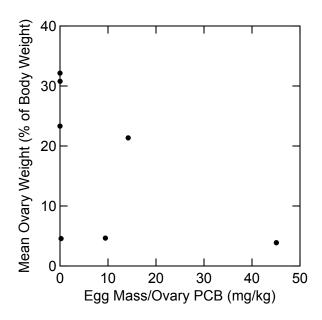


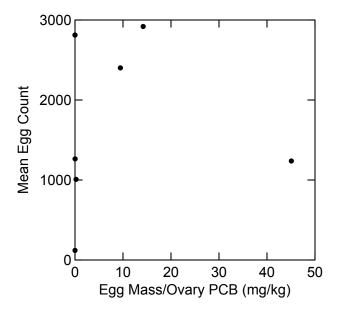


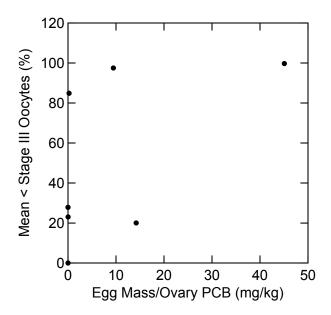


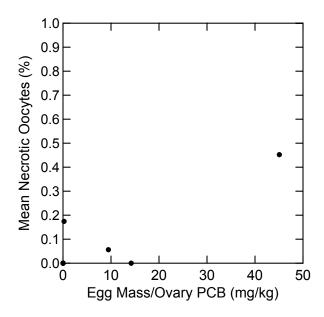


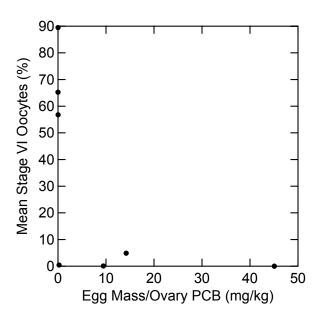












Appendix E

Developmental Study Data Crossover Study Data Spike Study Data

Developmental Study

Raw Data:

Mortality/Metamorphosis Larval Stage/Malformations Larval Growth

HOUSATONIC RIVER PROJECT RANA pipiens DEVELOPMENTAL STUDY 2000 MORTALITY/METAMORPH DATA SUMMARY

Site '	W-7a (18.0	mg/Kg Sed	. PCB) Rep	s=4, 142 Da	ys*
	Mon	tality	Meta	morph	
DAY	%	SEM	%	SEM	N
					105
0	0.00	0.00	0.00	0.00	
7	0.00	0.00	0.00	0.00	
13	3.00	1.00	0.00	0.00	
24	54.33	6.19	0.00	0.00	
31	71.17	5.60	0.00	0.00	
36	76.17	6.96	0.00	0.00	
49	81.67	5.09	0.00	0.00	
71	85.00	1.91	0.00	0.00	
105	85.00	1.91	0.00	0.00	
133	87.67	0.33	1.00	1.00	
142	87.67	0.33	1.00	1.00	
Cumulative	87.67	0.33	1.00	1.00	

Site	W-6 (42.0	mg/Kg Sed.	PCB) Reps	=4, 128 Day	's*
	Mor	tality	Metai	morph	
DAY	%	SEM	%	SEM	N
					98
0	0.00	0.00	0.00	0.00	
10	0.00	0.00	0.00	0.00	
17	13.09	4.06	0.00	0.00	
22	75.65	10.88	0.00	0.00	
35	84.65	5.29	0.00	0.00	
57	84.65	5.29	0.00	0.00	
91	88.65	4.58	0.00	0.00	
106	90.65	3.66	1.00	1.00	
108	90.65	3.66	2.00	2.00	
113	90.65	3.66	3.00	3.00	
128	91.74	2.96	3.00	3.00	
Cumulative	91.74	2.96	3.00	3.00	

Site	W-4 (0.46	mg/Kg Sed.	PCB) Reps	=8, 148 Day	/S*
	Mor	tality	Metai	morph	
DAY	%	SEM	%	SEM	N
					210
0	0.00	0.00	0.00	0.00	
6	1.92	1.92	0.00	0.00	
13	27.08	26.08	0.00	0.00	
19	47.33	16.33	0.00	0.00	
30	84.58	4.58	0.00	0.00	
37	86.08	3.08	0.00	0.00	
42	88.58	0.58	0.00	0.00	
55	92.08	0.08	0.00	0.00	
77	92.08	0.08	0.00	0.00	
111	92.58	0.58	0.42	0.42	
113	92.58	0.58	0.42	0.42	
133	93.58	0.42	0.92	0.92	
148	95.58	0.42	0.92	0.92	
Cumulative	92.58	0.42	0.92	0.92	

Site	EW-3 (30.0	mg/Kg Sed	d. PCB) Rep	s=1, 28 Day	/S*
	Mort	ality	Metar	morph	
DAY	%	SEM	%	SEM	N
					10
0	0.00	na	0.00	na	
10	10.00	na	0.00	na	
17	20.00	na	0.00	na	
22	70.00	na	0.00	na	
24	90.00	na	0.00	na	
28	100.00	na	0.00	na	
	400.00		0.00		
Cumulative	100.00	na	0.00	na	

Cito	M 1 (0 1E	malka Cod	DCD) Dono	-4 142 Day	·*
Site				=4, 142 Day	15
	Mor	tality	Metai	morph	
DAY	%	SEM	%	SEM	N
					105
0	0.00	0.00	0.00	0.00	
7	0.00	0.00	0.00	0.00	
14	47.83	3.72	0.00	0.00	
24	82.83	10.87	0.00	0.00	
31	83.67	10.92	0.00	0.00	
36	84.67	9.96	0.00	0.00	
49	84.67	9.96	0.00	0.00	
71	85.67	10.38	0.00	0.00	
105	86.67	9.43	0.00	0.00	
142	91.67	5.00	0.00	0.00	
Cumulative	91.67	5.00	0.00	0.00	

REFERENC	CE SITE D	ATA SHARE	<u>-D WITH C</u>	ROSSOVER	RSTUDY
R3 in Ref	Site MP (0.04 mg/Kg	Sed. PCB)	Reps=8, 113	B Days*
	Mor	ality	Metai	morph	
DAY	%	SEM	%	SEM	N
					160
0	0.00	0.00	0.00	0.00	
7	11.25	1.25	0.00	0.00	
20	12.50	1.25	0.00	0.00	
42	14.38	0.63	0.00	0.00	
48	14.38	0.63	0.00	0.00	
76	21.88	4.38	0.00	0.00	
84	22.50	5.00	2.50	0.00	
96	25.00	3.75	5.63	1.88	
113	43.75	1.25	5.63	1.88	
Cumulative	43.75	1.25	5.63	1.88	

Metamorph	Data Sum	mary of Add	itional R3 Spe	cimens								
R3 in Dechlorinated Tap Water												
	Metai	morph										
	%	SEM	N									
			160									
Cumulative	62.50	6.69										

^{*}Test Duration

			EI	M01-1					01-2				EM01-3					EM01-4			1	CUMULATIVE	1	CUMULA	ATIVE
DATE DAY				. CUMUL. % METAM. DEAD	% METAN	NO. I. DEAD	CUMUL. DEAD	CUMUL. LIVE	CUMUL. % METAM. DEAD I	% METAM.	NO. DEAD	CUMUL. DEAD	CUMUL. LIVE	CUMUL. % METAM. DEAD N	% //ETAM.	NO. DEAD	CUMUL. DEAD	CUMUL. LIVE	CUMUL. % METAM. DEAD	% METAM.		TALITY STATISTICS VAR (S2) SEM CV (%)			STATISTICS SEM CV (%)
4/25/2000 0	0	0	30	0.00	0.00	0	0	25	0.00	0.00	0	0	25	0.00	0.00	0	0	25	0.00	0.00	0.00	0.00 0.00 na	0.00	0.00	0.00 na
4/26/2000 1	0	Ö	30	0.00	0.00	ő	ő	25	0.00	0.00	0	0	25	0.00	0.00	0	0	25	0.00	0.00	0.00	0.00 0.00 na	0.00	0.00	0.00 na
4/27/2000 2	0	0	30	0.00	0.00	0	0	25	0.00	0.00	0	0	25	0.00	0.00	0	0	25	0.00	0.00	0.00	0.00 0.00 na	0.00	0.00	0.00 na
4/28/2000 3 5/1/2000 6	0	0	30 30	0.00	0.00	0	0	25 25	0.00 0.00	0.00	0	0	25 25	0.00	0.00	0	0	25 25	0.00 0.00	0.00	0.00	0.00 0.00 na 0.00 0.00 na	0.00	0.00	0.00 na 0.00 na
5/2/2000 7	0	Ö	30	0.00	0.00	ő	ő	25	0.00	0.00	0	0	25	0.00	0.00	0	0	25	0.00	0.00	0.00	0.00 0.00 na	0.00	0.00	0.00 na
5/8/2000 13	0	0	30	0.00	0.00	1	1	24	4.00	0.00	1	1	24	4.00	0.00	1	1	24	4.00	0.00	3.00	4.00 1.00 66.67	0.00	0.00	0.00 na
5/9/2000 14 5/11/2000 16	0 8	0 8	30 22	0.00 26.67	0.00	0	1 5	24 20	4.00 20.00	0.00	1 5	2	23 18	8.00 28.00	0.00	0	1 2	24 23	4.00 8.00	0.00	4.00 20.67	10.67 1.63 81.65 83.56 4.57 44.23	0.00	0.00	0.00 na 0.00 na
5/12/2000 17	7	15	15	50.00	0.00	7	12	13	48.00	0.00	2	9	16	36.00	0.00	3	5	20	20.00	0.00	38.50	190.33 6.90 35.83	0.00	0.00	0.00 na
5/15/2000 20	0	15	15	50.00	0.00	5	17	8	68.00	0.00	3	12	13	48.00	0.00	4	9	16	36.00	0.00	50.50	174.33 6.60 26.15	0.00	0.00	0.00 na
5/17/2000 22 5/19/2000 24	0	16 16	14 14	53.33 53.33	0.00	0	18 18	7 7	72.00 72.00	0.00	0	12 12	13 13	48.00 48.00	0.00	1	10 11	15 14	40.00 44.00	0.00	53.33 54.33	184.89 6.80 25.50 153.33 6.19 22.79	0.00	0.00	0.00 na 0.00 na
5/22/2000 27	0	16	14	53.33	0.00	0	18	7	72.00	0.00	8	20	5	80.00	0.00	3	14	11	56.00	0.00	65.33	163.56 6.39 19.57	0.00	0.00	0.00 na
5/23/2000 28 5/24/2000 29	0	16 16	14 14	53.33 53.33	0.00	0	18 18	7 7	72.00 72.00	0.00	1	21 21	4	84.00 84.00	0.00	1	15 16	10 9	60.00 64.00	0.00	67.33 68.33	183.11 6.77 20.10 167.56 6.47 18.94	0.00	0.00	0.00 na 0.00 na
5/25/2000 29	1	17	13	56.67	0.00	0	18	7	72.00	0.00	0	21	4	84.00	0.00	0	16	9	64.00	0.00	69.17	137.00 5.85 16.92	0.00	0.00	0.00 na
5/26/2000 31	0	17	13	56.67	0.00	0	18	7	72.00	0.00	0	21	4	84.00	0.00	2	18	7	72.00	0.00	71.17	125.44 5.60 15.74	0.00	0.00	0.00 na
5/30/2000 35 5/31/2000 36	0	17 17	13 13	56.67 56.67	0.00	1 0	19 19	6 6	76.00 76.00	0.00	0	21 21	4	84.00 84.00	0.00	4 0	22 22	3	88.00 88.00	0.00	76.17 76.17	193.89 6.96 18.28 193.89 6.96 18.28	0.00	0.00	0.00 na 0.00 na
6/1/2000 37	0	17	13	56.67	0.00	1	20	5	80.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	77.17	197.44 7.03 18.21	0.00	0.00	0.00 na
6/2/2000 38	0	17	13	56.67	0.00	0	20	5	80.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	77.17	197.44 7.03 18.21	0.00	0.00	0.00 na
6/5/2000 41 6/6/2000 42	3	20 20	10 10	66.67 66.67	0.00	0	22 22	3	88.00 88.00	0.00	0	21 21	4 4	84.00 84.00	0.00	0	22 22	3	88.00 88.00	0.00	81.67 81.67	103.56 5.09 12.46 103.56 5.09 12.46	0.00	0.00	0.00 na 0.00 na
6/8/2000 44	0	20	10	66.67	0.00	o	22	3	88.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	81.67	103.56 5.09 12.46	0.00	0.00	0.00 na
6/12/2000 48	0	20	10	66.67	0.00	0	22	3	88.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	81.67	103.56 5.09 12.46	0.00	0.00	0.00 na
6/13/2000 49 6/14/2000 50	0	20 20	10 10	66.67 66.67	0.00	0	22 22	3	88.00 88.00	0.00	0	21 21	4	84.00 84.00	0.00	0	22 22	3	88.00 88.00	0.00	81.67 81.67	103.56 5.09 12.46 103.56 5.09 12.46	0.00	0.00	0.00 na 0.00 na
6/15/2000 51	0	20	10	66.67	0.00	o	22	3	88.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	81.67	103.56 5.09 12.46	0.00	0.00	0.00 na
6/16/2000 52	0	20	10	66.67	0.00	0	22	3	88.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	81.67	103.56 5.09 12.46	0.00	0.00	0.00 na
6/19/2000 55 6/20/2000 56	2	22 24	8 6	73.33 80.00	0.00	0	22 22	3	88.00 88.00	0.00	0	21 21	4	84.00 84.00	0.00	0	22 22	3	88.00 88.00	0.00	83.33 85.00	48.00 3.46 8.31 14.67 1.91 4.51	0.00	0.00	0.00 na 0.00 na
6/21/2000 57	0	24	6	80.00	0.00	o	22	3	88.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	85.00	14.67 1.91 4.51	0.00	0.00	0.00 na
6/22/2000 58	0	24	6	80.00	0.00	0	22	3	88.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	85.00	14.67 1.91 4.51	0.00	0.00	0.00 na
6/23/2000 59	0	24 24	6	80.00 80.00	0.00	0	22 22	3	88.00 88.00	0.00	0	21 21	4	84.00 84.00	0.00	0	22 22	3	88.00 88.00	0.00	85.00 85.00	14.67 1.91 4.51 14.67 1.91 4.51	0.00	0.00	0.00 na 0.00 na
6/27/2000 63	0	24	6	80.00	0.00	0	22	3	88.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	85.00	14.67 1.91 4.51	0.00	0.00	0.00 na
6/28/2000 64 6/29/2000 65	0	24	6	80.00 80.00	0.00	0	22 22	3	88.00 88.00	0.00	0	21	4	84.00 84.00	0.00	0	22 22	3	88.00 88.00	0.00	85.00 85.00	14.67 1.91 4.51 14.67 1.91 4.51	0.00	0.00	0.00 na 0.00 na
6/30/2000 66	0	24	6	80.00	0.00	0	22	3	88.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	85.00	14.67 1.91 4.51	0.00	0.00	0.00 na 0.00 na
7/5/2000 71	0	24	6	80.00		0	22	3	88.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	85.00	14.67 1.91 4.51	0.00	0.00	0.00 na
7/6/2000 72 7/7/2000 73	0	24 24	6	80.00 80.00	0.00	0	22 22	3	88.00 88.00	0.00	0	21 21	4	84.00 84.00	0.00	0	22 22	3	88.00 88.00	0.00	85.00 85.00	14.67 1.91 4.51 14.67 1.91 4.51	0.00	0.00	0.00 na 0.00 na
7/10/2000 76	0	24	6	80.00		0	22	3	88.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	85.00	14.67 1.91 4.51	0.00	0.00	0.00 na
7/11/2000 77	0	24	6	80.00		0	22	3	88.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	85.00	14.67 1.91 4.51	0.00	0.00	0.00 na
7/12/2000 78 7/13/2000 79	0	24 24	6	80.00 80.00		0	22 22	3	88.00 88.00	0.00	0	21 21	4	84.00 84.00	0.00	0	22 22	3	88.00 88.00	0.00	85.00 85.00	14.67 1.91 4.51 14.67 1.91 4.51	0.00	0.00	0.00 na 0.00 na
7/17/2000 83	0	24	6	80.00		o	22	3	88.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	85.00	14.67 1.91 4.51	0.00	0.00	0.00 na
7/18/2000 84	0	24	6	80.00		0	22	3	88.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	85.00	14.67 1.91 4.51	0.00	0.00	0.00 na
7/19/2000 85 7/20/2000 86	0	24 24	6	80.00 80.00	0.00	0	22 22	3	88.00 88.00	0.00	0	21 21	4	84.00 84.00	0.00	0	22 22	3	88.00 88.00	0.00	85.00 85.00	14.67 1.91 4.51 14.67 1.91 4.51	0.00	0.00	0.00 na 0.00 na
7/21/2000 87	0	24	6	80.00	0.00	Ö	22	3	88.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	85.00	14.67 1.91 4.51	0.00	0.00	0.00 na
7/24/2000 90	0	24	6	80.00 80.00		0	22 22	3	88.00 88.00	0.00	0	21	4	84.00 84.00	0.00	0	22	3	88.00 88.00	0.00	85.00 85.00	14.67 1.91 4.51 14.67 1.91 4.51	0.00	0.00	0.00 na 0.00 na
7/25/2000 91 7/26/2000 92	0	24 24	6	80.00	0.00	0	22	3	88.00	0.00	0	21 21	4	84.00	0.00	0	22 22	3	88.00	0.00	85.00	14.67 1.91 4.51 14.67 1.91 4.51	0.00	0.00	0.00 na 0.00 na
7/27/2000 93	Ō	24	6	80.00	0.00	ō	22	3	88.00	0.00	ō	21	4	84.00	0.00	Ō	22	3	88.00	0.00	85.00	14.67 1.91 4.51	0.00	0.00	0.00 na
7/28/2000 94 7/31/2000 97	0	24 24	6	80.00 80.00	0.00	0	22 22	3	88.00 88.00	0.00	0	21 21	4	84.00 84.00	0.00	0	22 22	3	88.00 88.00	0.00	85.00 85.00	14.67 1.91 4.51 14.67 1.91 4.51	0.00	0.00	0.00 na 0.00 na
8/1/2000 98	0	24	6	80.00	0.00	0	22	3	88.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	85.00	14.67 1.91 4.51	0.00	0.00	0.00 na
8/3/2000 100	0	24	6	80.00	0.00	0	22	3	88.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	85.00	14.67 1.91 4.51	0.00	0.00	0.00 na
8/4/2000 101 8/7/2000 104	0	24 24	6	80.00 80.00	0.00	0	22 22	3	88.00 88.00	0.00	0	21 21	4	84.00 84.00	0.00	0	22 22	3	88.00 88.00	0.00	85.00 85.00	14.67 1.91 4.51 14.67 1.91 4.51	0.00	0.00	0.00 na 0.00 na
8/8/2000 104	0	24	6	80.00	0.00	0	22	3	88.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	85.00	14.67 1.91 4.51	0.00	0.00	0.00 na
8/9/2000 106	0	24	6	80.00	0.00	0	22	3	88.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	85.00	14.67 1.91 4.51	0.00	0.00	0.00 na
8/10/2000 107 8/11/2000 108	0	24 24	6	80.00 80.00	0.00	0	22 22	3	88.00 88.00	0.00	0	21 21	4	84.00 84.00	0.00	0	22 22	3	88.00 88.00	0.00	85.00 85.00	14.67 1.91 4.51 14.67 1.91 4.51	0.00	0.00	0.00 na 0.00 na
8/14/2000 111	0	24	6	80.00	0.00	ō	22	3	88.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	85.00	14.67 1.91 4.51	0.00	0.00	0.00 na
8/15/2000 112	0	24	6	80.00		0	22	3	88.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	85.00	14.67 1.91 4.51	0.00	0.00	0.00 na
8/16/2000 113	0	24	6	80.00	0.00	0	22	3	88.00	0.00	0	21	4	84.00	0.00	0	22	3	88.00	0.00	85.00	14.67 1.91 4.51	0.00	0.00	0.00 na

	EM01-1 NO. CUMUL. CUMUL. CUMUL. %						NO.	CUMUL.	EM CUMUL.	01-2 CUMUL.	9/2	9/.	NO.	CUMUL.	EM01-3 CUMUL.	CUMUL. %	9/4	l no.	CUMUL.	EM01-4 CUMUL.	CUMUL.	9/_	9/4		CUMULA		rics	MET	CUMULA AMORPH		ice
DATE DAY					/0 -ΔΠ Ι	% METAM.		DEAD.	LIVE		DEAD	METAM.	DEAD	DEAD.	LIVE	METAM. DEAD	METAM	DEAD	DEAD.	LIVE		DEAD	METAM	MEAN %							CV (%)
DAIL DAI	DEAD	DLAD	LIVL	WILLIAM. DE		VIL I AWI.	DLAD	DLAD	LIVL	WILL I AWI.	DEAD	IVIL I / NIVI.	DLAD	DLAD	LIVE	WILLIAM. DEAD	IVIL I AIVI.	DEAD	DEAD	LIVE	IVIL I AWI.	DLAD	IVIL I AIVI.	WILKIN /0	VAIX (02)	OLIVI	OV (70)	IVILAIN 70	VAIX (UZ)	OLIVI	CV (70)
8/17/2000 114	0	24	6	80	.00	0.00	0	22	3		88.00	0.00	0	21	4	84.00	0.00	0	22	3		88.00	0.00	85.00	14.67	1.91	4.51	0.00	0.00	0.00	na
8/18/2000 115	0	24	6	80	.00	0.00	0	22	3		88.00	0.00	0	21	4	84.00	0.00	0	22	3		88.00	0.00	85.00	14.67	1.91	4.51	0.00	0.00	0.00	na
8/21/2000 118	0	24	6	80	.00	0.00	0	22	3		88.00	0.00	0	21	4	84.00	0.00	0	22	3		88.00	0.00	85.00	14.67	1.91	4.51	0.00	0.00	0.00	na
8/22/2000 119	0	24	6	80	.00	0.00	0	22	3		88.00	0.00	0	21	4	84.00	0.00	0	22	3		88.00	0.00	85.00	14.67	1.91	4.51	0.00	0.00	0.00	na
8/23/2000 120	0	24	6	80	.00	0.00	0	22	3		88.00	0.00	0	21	4	84.00	0.00	0	22	3		88.00	0.00	85.00	14.67	1.91	4.51	0.00	0.00	0.00	na
8/24/2000 121	0	24	6	80	.00	0.00	0	22	3		88.00	0.00	0	21	4	84.00	0.00	0	22	3		88.00	0.00	85.00	14.67	1.91	4.51	0.00	0.00	0.00	na
8/25/2000 122	0	24	6	80	.00	0.00	0	22	3		88.00	0.00	0	21	4	84.00	0.00	0	22	3		88.00	0.00	85.00	14.67	1.91	4.51	0.00	0.00	0.00	na
8/28/2000 125	0	24	6	80	.00	0.00	0	22	3		88.00	0.00	0	21	4	84.00	0.00	0	22	3		88.00	0.00	85.00	14.67	1.91	4.51	0.00	0.00	0.00	na
8/29/2000 126	0	24	6	80	.00	0.00	0	22	3		88.00	0.00	0	21	4	84.00	0.00	0	22	3		88.00	0.00	85.00	14.67	1.91	4.51	0.00	0.00	0.00	na
8/30/2000 127	0	24	6	80	.00	0.00	0	22	3		88.00	0.00	0	21	4	84.00	0.00	0	22	3		88.00	0.00	85.00	14.67	1.91	4.51	0.00	0.00	0.00	na
8/31/2000 128	0	24	6	80	.00	0.00	0	22	3		88.00	0.00	0	21	4	84.00	0.00	0	22	3		88.00	0.00	85.00	14.67	1.91	4.51	0.00	0.00	0.00	na
9/1/2000 129	0	24	6	80	.00	0.00	0	22	3		88.00	0.00	1	22	3	88.00	0.00	0	22	3		88.00	0.00	86.00	16.00	2.00	4.65	0.00	0.00	0.00	na
9/5/2000 133	2	26	4	86	.67	0.00	0	22	3		88.00	0.00	0	22	3	88.00	0.00	0	22	3	1	88.00	4.00	87.67	0.44	0.33	0.76	1.00	4.00	1.00	200.00
9/6/2000 134	0	26	4	86	.67	0.00	0	22	3		88.00	0.00	0	22	3	88.00	0.00	0	22	3	1	88.00	4.00	87.67	0.44	0.33	0.76	1.00	4.00	1.00	200.00
9/7/2000 135	0	26	4	86	.67	0.00	0	22	3		88.00	0.00	0	22	3	88.00	0.00	0	22	3	1	88.00	4.00	87.67	0.44	0.33	0.76	1.00	4.00	1.00	200.00
9/8/2000 136	0	26	4	86	.67	0.00	0	22	3		88.00	0.00	0	22	3	88.00	0.00	0	22	3	1	88.00	4.00	87.67	0.44	0.33	0.76	1.00	4.00	1.00	200.00
9/11/2000 139	0	26	4	86	.67	0.00	0	22	3		88.00	0.00	0	22	3	88.00	0.00	0	22	3	1	88.00	4.00	87.67	0.44	0.33	0.76	1.00	4.00	1.00	200.00
9/12/2000 140	0	26	4	86	.67	0.00	0	22	3		88.00	0.00	0	22	3	88.00	0.00	0	22	3	1	88.00	4.00	87.67	0.44	0.33	0.76	1.00	4.00	1.00	200.00
9/13/2000 141	0	26	4	86	.67	0.00	0	22	3		88.00	0.00	0	22	3	88.00	0.00	0	22	3	1	88.00	4.00	87.67	0.44	0.33	0.76	1.00	4.00	1.00	200.00
9/14/2000 142	0	26	4	86	.67	0.00	0	22	3		88.00	0.00	0	22	3	88.00	0.00	0	22	3	1	88.00	4.00	87.67	0.44	0.33	0.76	1.00	4.00	1.00	200.00
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8/22/2000 105 0 23 2 92.00 0.00 0 22 3 1 88.00 0.00 0 25 0 100.00 0.00 0 19 4 82.61 0.00 90.65 53.64 3.66 8.08 0.00 0.00 0.00 0.00 0 8/24/2000 107 0 23 2 92.00 0.00 0 22 3 1 88.00 8.00 0 25 0 100.00 0.00 0 19 4 82.61 0.00 90.65 53.64 3.66 8.08 1.00 4.00 1.00 20.00 0 8/24/2000 111 0 23 2 92.00 0.00 0 22 3 2 88.00 8.00 0 25 0 100.00 0.00 0 19 4 82.61 0.00 90.65 53.64 3.66 8.08 2.00 16.00 2.00 200.00 8/24/2000 111 0 23 2 92.00 0.00 0 22 3 2 88.00 8.00 0 25 0 100.00 0.00 0 19 4 82.61 0.00 90.65 53.64 3.66 8.08 2.00 16.00 2.00 200.00 8/24/2000 111 0 23 2 92.00 0.00 0 22 3 2 88.00 8.00 0 25 0 100.00 0.00 0 19 4 82.61 0.00 90.65 53.64 3.66 8.08 2.00 16.00 2.00 200.00 8/24/2000 112 0 23 2 92.00 0.00 0 22 3 2 88.00 8.00 0 25 0 100.00 0.00 0 19 4 82.61 0.00 90.65 53.64 3.66 8.08 2.00 16.00 2.00 200.00 8/24/2000 112 0 23 2 92.00 0.00 0 22 3 3 88.00 8.00 0 25 0 100.00 0.00 0 19 4 82.61 0.00 90.65 53.64 3.66 8.08 2.00 16.00 2.00 200.00 8/24/2000 113 0 23 2 92.00 0.00 0 22 3 3 88.00 8.00 0 25 0 100.00 0.00 0 19 4 82.61 0.00 90.65 53.64 3.66 8.08 2.00 16.00 2.00 200.00 8/24/2000 113 0 23 2 92.00 0.00 0 22 3 3 88.00 8.00 0 25 0 100.00 0.00 0 19 4 82.61 0.00 90.65 53.64 3.66 8.08 2.00 16.00 2.00 200.00			-						-		5 3				-						-		4										
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8/25/2000 108 0 23 2 92.00 0.00 0 22 3 2 88.00 8.00 0 25 0 100.00 0.00 0 19 4 82.61 0.00 90.65 53.64 3.66 8.08 2.00 16.00 200.00 0 8/28/2000 111 0 23 2 92.00 0.00 0 22 3 2 88.00 8.00 0 25 0 100.00 0.00 0 19 4 82.61 0.00 90.65 53.64 3.66 8.08 2.00 16.00 2.00 200.00 8/28/2000 112 0 23 2 92.00 0.00 0 22 3 2 88.00 8.00 0 25 0 100.00 0.00 0 19 4 82.61 0.00 90.65 53.64 3.66 8.08 2.00 16.00 2.00 200.00 8/30/2000 113 0 23 2 92.00 0.00 0 22 3 3 88.00 12.00 0 25 0 100.00 0.00 0 19 4 82.61 0.00 90.65 53.64 3.66 8.08 3.00 3.00 3.00 200.00			-		_				-		-				-		-				-		4										
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8/30/2000 113 0 23 2 92.00 0.00 0 22 3 3 88.00 12.00 0 25 0 100.00 0.00 0 19 4 82.61 0.00 90.65 53.64 3.66 8.08 3.00 3.00 3.00 200.00			-		_				-		-	_			-		-				-		4										
	8/30/2000 1	13	0	23	2		92.00	0.00	0	22	3	3	88.00	12.00	0	25	0		100.00	0.00	0	19	4		82.61	0.00	90.65	53.64	3.66	8.08	3.00	36.00	3.00 200.00
8/31/2000 114 0 23 2 92.00 0.00 0 22 3 3 88.00 12.00 0 25 0 100.00 0.00 19 4 82.61 0.00 90.65 53.64 3.66 8.08 3.00 36.00 3.00 20.00 0 91/2000 115 0 23 2 92.00 0.00 0 22 3 3 88.00 12.00 0 25 0 100.00 0.00 0 19 4 82.61 0.00 90.65 53.64 3.66 8.08 3.00 36.00 3.00 20.00 0 91/2000 115 0 23 2 92.00 0.00 0 22 3 3 88.00 12.00 0 25 0 100.00 0.00 0 19 4 82.61 0.00 90.65 53.64 3.66 8.08 3.00 36.00 3.00 20.00 0 20.00 0 20 20 3 3 88.00 12.00 0 25 0 100.00 0.00 0 19 4 82.61 0.00 90.65 53.64 3.66 8.08 3.00 36.00 3.00 20.00 0 20 20 3 3 88.00 12.00 0 25 0 100.00 0.00 0 19 4 82.61 0.00 90.65 53.64 3.66 8.08 3.00 36.00 3.00 20.00 0 20 20 3 3 88.00 12.00 0 25 0 100.00 0.00 0 19 4 82.61 0.00 90.65 53.64 3.66 8.08 3.00 36.00 3.00 20.00 0 20 20 3 3 88.00 12.00 0 25 0 100.00 0.00 0 19 4 82.61 0.00 90.65 53.64 3.66 8.08 3.00 36.00 3.00 20.00 0 20 20 3 3 88.00 12.00 0 25 0 100.00 0 0.00 0 19 4 82.61 0.00 90.65 53.64 3.66 8.08 3.00 36.00 3.00 20.00 0 20 20 20 20 20 20 20 20 20 20 20 20																	-						4										

		TP01-1 TP01-2														TP	01-3					TP	01-4			ĺ	CUMULA	TIVE		ĺ	CUMULA	ΓIVE	
		NO.	CUMUL. C	UMUL.	CUMUL.	%	%	NO.	CUMUL.	CUMUL.	CUMUL.	%	%	NO.	CUMUL.	CUMUL.	CUMUL.	%	%	NO.	CUMUL.	CUMUL.	CUMUL.	%	%	MOF	RTALITY S	TATISTI	CS	META	MORPH S	TATISTI	ICS
DATE	DAY	DEAD	DEAD	LIVE	METAM.	DEAD	METAM.	DEAD	DEAD	LIVE	METAM.	DEAD	METAM.	DEAD	DEAD	LIVE	METAM.	DEAD	METAM.	DEAD	DEAD	LIVE	METAM.	DEAD	METAM.	MEAN %	VAR (S2)	SEM	CV (%)	MEAN %	VAR (S2)	SEM	CV (%)
9/5/2000	119	0	23	2		92.00	0.00	0	22	3	3	88.00	12.00	0	25	0		100.00	0.00	1	20	3		86.96	0.00	91.74	35.05	2.96	6.45	3.00	36.00	3.00	200.00
9/6/2000	120	0	23	2		92.00	0.00	0	22	3	3	88.00	12.00	0	25	0		100.00	0.00	0	20	3		86.96	0.00	91.74	35.05	2.96	6.45	3.00	36.00	3.00	200.00
9/7/2000	121	0	23	2		92.00	0.00	0	22	3	3	88.00	12.00	0	25	0		100.00	0.00	0	20	3		86.96	0.00	91.74	35.05	2.96	6.45	3.00	36.00	3.00	200.00
9/8/2000	122	0	23	2		92.00	0.00	0	22	3	3	88.00	12.00	0	25	0		100.00	0.00	0	20	3		86.96	0.00	91.74	35.05	2.96	6.45	3.00	36.00	3.00	200.00
9/11/2000	125	0	23	2		92.00	0.00	0	22	3	3	88.00	12.00	0	25	0		100.00	0.00	0	20	3		86.96	0.00	91.74	35.05	2.96	6.45	3.00	36.00	3.00	200.00
9/12/2000	126	0	23	2		92.00	0.00	0	22	3	3	88.00	12.00	0	25	0		100.00	0.00	0	20	3		86.96	0.00	91.74	35.05	2.96	6.45	3.00	36.00	3.00	200.00
9/13/2000	127	0	23	2		92.00	0.00	0	22	3	3	88.00	12.00	0	25	0		100.00	0.00	0	20	3		86.96	0.00	91.74	35.05	2.96	6.45	3.00	36.00	3.00	200.00
9/14/2000	128	0	23	2		92.00	0.00	0	22	3	3	88.00	12.00	0	25	0		100.00	0.00	0	20	3		86.96	0.00	91.74	35.05	2.96	6.45	3.00	36.00	3.00	200.00

	1			101-1	1		EM01-2			1		EM01-3					EM01-4			1	CUMUL		[l	CUMULA	
DATE DA		D DEAD	. CUMUL. LIVE	CUMUL. % % METAM. DEAD MET	NO. AM. DEAD		CUMUL. CUMU	JL. % M. DEAD	% METAM.		DEAD	CUMUL. CUMU	JL. % M. DEAD	% METAM.			CUMUL. CL	JMUL. % ETAM. DEAI	% METAM		VAR (S2)					STATISTICS SEM CV (%)
		0	30			0	25			0	0	25			0	0				0.00				0.00		
4/19/2000 0 4/20/2000 1	0	0	30	0.00 0.0 0.00 0.0		0	25 25	0.00	0.00	0	0	25 25	0.00	0.00	0	0	25 25	0.00		0.00	0.00	0.00	na na	0.00	0.00	0.00 na 0.00 na
4/21/2000 2	0	0	30	0.00 0.0		0	25	0.00	0.00	0	0	25	0.00	0.00	0	0	25	0.00		0.00	0.00	0.00	na	0.00	0.00	0.00 na 0.00 na
4/24/2000 5 4/25/2000 6	0	0 1	30 29	3.33 0.0		0 2	25 23	8.00	0.00	0	0 1	25 24	4.00	0.00	0	0	25 25	0.00		0.00 3.83	10.78	1.64	na 85.64	0.00	0.00	0.00 na 0.00 na
4/26/2000 7	9	10	20	33.33 0.0		12	13	48.00	0.00	10	11	14	44.00	0.00	2	2	23	8.00	0.00	33.33	323.56	8.99	53.96	0.00	0.00	0.00 na
4/27/2000 8 4/28/2000 9	0	10 10	20 20	33.33 0.0 33.33 0.0		16 16	9	64.00 64.00	0.00	7 2	18 20	7 5	72.00 80.00	0.00	1	3 4	22 21	12.00 16.00		45.33 48.33	771.56 839.56	13.89 14.49	61.27 59.95	0.00	0.00	0.00 na 0.00 na
5/1/2000 12		10	20	33.33 0.0	-	16	9	64.00	0.00	1	21	4	84.00	0.00	1	5	20	20.00	0.00	50.33	843.11	14.52	57.69	0.00	0.00	0.00 na
5/2/2000 13 5/5/2000 16		11 12	19 18	36.67 0.0 40.00 0.0		17 18	8 7	68.00 72.00	0.00	0	21 22	4 3	84.00 88.00	0.00	1	6 10	19 15	24.00 40.00		53.17 60.00	764.56 576.00	13.83 12.00	52.01 40.00	0.00	0.00	0.00 na 0.00 na
5/8/2000 19		14	16	46.67 0.0		18	7	72.00	0.00	0	22	3	88.00	0.00	2	12	13	48.00	0.00	63.67	398.67	9.98	31.36	0.00	0.00	0.00 na
5/9/2000 20 5/11/2000 22		20 28	10 2	66.67 0.0 93.33 0.0		18 19	7 6	72.00 76.00	0.00	0	22 22	3	88.00 88.00	0.00	5 1	17 18	8 7	68.00 72.00		73.67 82.33	96.44 100.00	4.91 5.00	13.33 12.15	0.00	0.00	0.00 na 0.00 na
5/12/2000 23	1	29	ī	96.67 0.0	0 0	19	6	76.00	0.00	ō	22	3	88.00	0.00	Ó	18	7	72.00	0.00	83.17	127.22	5.64	13.56	0.00	0.00	0.00 na
5/15/2000 26 5/17/2000 28	0	29 29	1	96.67 0.0 96.67 0.0		19 19	6	76.00 76.00	0.00	0	22 22	3	88.00 88.00	0.00	6	24 24	1	96.00 96.00		89.17 89.17	92.56 92.56	4.81 4.81	10.79 10.79	0.00	0.00	0.00 na 0.00 na
5/19/2000 30	0	29	1	96.67 0.0	0 0	19	6	76.00	0.00	ō	22	3	88.00	0.00	Ō	24	1	96.00	0.00	89.17	92.56	4.81	10.79	0.00	0.00	0.00 na
5/22/2000 33 5/23/2000 34	0	29 29	1	96.67 0.0 96.67 0.0		19 19	6	76.00 76.00	0.00	0	22 22	3	88.00 88.00	0.00	0	24 24	1	96.00 96.00		89.17 89.17	92.56 92.56	4.81 4.81	10.79 10.79	0.00	0.00	0.00 na 0.00 na
5/24/2000 35	0	29	1	96.67 0.0	0	19	6	76.00	0.00	0	22	3	88.00	0.00	0	24	1	96.00	0.00	89.17	92.56	4.81	10.79	0.00	0.00	0.00 na
5/25/2000 36 5/26/2000 37	0	29 29	1	96.67 0.0 96.67 0.0		19 19	6	76.00 76.00	0.00	0	22 22	3	88.00 88.00	0.00	0	24 24	1	96.00 96.00		89.17 89.17	92.56 92.56	4.81 4.81	10.79 10.79	0.00	0.00	0.00 na 0.00 na
5/30/2000 41	0	29	1	96.67 0.0		19	6	76.00	0.00	0	22	3	88.00	0.00	0	24	1	96.00		89.17	92.56	4.81	10.79	0.00	0.00	0.00 na
5/31/2000 42 6/1/2000 43		29 29	1	96.67 0.0 96.67 0.0		19 19	6	76.00 76.00	0.00	0	22 22	3	88.00 88.00	0.00	0	24 24	1	96.00 96.00		89.17 89.17	92.56 92.56	4.81 4.81	10.79 10.79	0.00	0.00	0.00 na 0.00 na
6/2/2000 44	0	29	1	96.67 0.0		19	6	76.00	0.00	0	22	3	88.00	0.00	0	24	1	96.00		89.17	92.56	4.81	10.79	0.00	0.00	0.00 na
6/5/2000 47 6/6/2000 48	0	29 29	1	96.67 0.0 96.67 0.0		20 20	5 5	80.00 80.00	0.00	0	22 23	3	88.00 92.00	0.00	0	24 24	1	96.00 96.00		90.17 91.17	61.44 59.67	3.92 3.86	8.69 8.47	0.00	0.00	0.00 na 0.00 na
6/8/2000 50		29	1	96.67 0.0		20	5	80.00	0.00	0	23	2	92.00	0.00	0	24	1	96.00		91.17	59.67	3.86	8.47	0.00	0.00	0.00 na
6/12/2000 54 6/13/2000 55	0	29 29	1	96.67 0.0 96.67 0.0		20 20	5 5	80.00	0.00	1	24 24	1	96.00 96.00	0.00	0	24 24	1	96.00 96.00		92.17 92.17	65.89 65.89	4.06	8.81 8.81	0.00	0.00	0.00 na 0.00 na
6/14/2000 56	0	29	1	96.67 0.0		20	5	80.00	0.00	0	24	i	96.00	0.00	0	24	1	96.00		92.17	65.89	4.06 4.06	8.81	0.00	0.00	0.00 na
6/15/2000 57 6/16/2000 58	0	29	1	96.67 0.0		20 20	5	80.00	0.00	0	24	1	96.00	0.00	0	24 24	1	96.00		92.17	65.89	4.06	8.81	0.00	0.00	0.00 na
6/16/2000 58 6/19/2000 61	0	29 29	1	96.67 0.0 96.67 0.0		20	5 5	80.00 80.00	0.00	0	24 24	i	96.00 96.00	0.00	0	24	1	96.00 96.00		92.17 92.17	65.89 65.89	4.06 4.06	8.81 8.81	0.00	0.00	0.00 na 0.00 na
6/20/2000 62		29	1	96.67 0.0 96.67 0.0		20	5	80.00	0.00	0	24	1	96.00	0.00	0	24	1	96.00		92.17	65.89	4.06	8.81	0.00	0.00	0.00 na
6/21/2000 63 6/22/2000 64	0	29 29	1	96.67 0.0 96.67 0.0		20 20	5 5	80.00 80.00	0.00	0	24 24	1	96.00 96.00	0.00	0	24 24	1	96.00 96.00		92.17 92.17	65.89 65.89	4.06 4.06	8.81 8.81	0.00	0.00	0.00 na 0.00 na
6/23/2000 65		29 29	1	96.67 0.0		20 20	5 5	80.00	0.00	0	24 24	1	96.00	0.00	0	24 24	1	96.00		92.17	65.89	4.06	8.81	0.00	0.00	0.00 na
6/26/2000 68 6/27/2000 69		29	1	96.67 0.0 96.67 0.0		20	5	80.00 80.00	0.00	0	24	1	96.00 96.00	0.00	0	24	1	96.00 96.00		92.17 92.17	65.89 65.89	4.06 4.06	8.81 8.81	0.00	0.00	0.00 na 0.00 na
6/28/2000 70		29	1	96.67 0.0	-	20	5	80.00	0.00	0	24	1	96.00	0.00	0	24	1	96.00		92.17	65.89	4.06	8.81	0.00	0.00	0.00 na
6/29/2000 71 6/30/2000 72	0	29 29	1	96.67 0.0 96.67 0.0		20 20	5 5	80.00 80.00	0.00	0	24 24	1	96.00 96.00	0.00	0	24 24	1	96.00 96.00		92.17 92.17	65.89 65.89	4.06 4.06	8.81 8.81	0.00	0.00	0.00 na 0.00 na
7/5/2000 77		29	1	96.67 0.0		20	5	80.00	0.00	0	24	1	96.00	0.00	0	24	1	96.00		92.17	65.89	4.06	8.81	0.00	0.00	0.00 na
7/6/2000 78 7/7/2000 79	0	29 29	1	96.67 0.0 96.67 0.0		20 20	5 5	80.00 80.00	0.00	0	24 24	1	96.00 96.00	0.00	0	24 24	1	96.00 96.00		92.17 92.17	65.89 65.89	4.06 4.06	8.81 8.81	0.00	0.00	0.00 na 0.00 na
7/10/2000 82	0	29	1	96.67 0.0		20	5	80.00	0.00	0	24	1	96.00	0.00	0	24	1	96.00	0.00	92.17	65.89	4.06	8.81	0.00	0.00	0.00 na
7/11/2000 83 7/12/2000 84	0	29 29	1	96.67 0.0 96.67 0.0		20 20	5 5	80.00 80.00	0.00	0	24 24	1	96.00 96.00	0.00	0	24 24	1	96.00 96.00		92.17 92.17	65.89 65.89	4.06 4.06	8.81 8.81	0.00	0.00	0.00 na 0.00 na
7/13/2000 85	_	29	1	96.67 0.0		20	5	80.00	0.00	0	24	1	96.00	0.00	0	24	1	96.00	0.00	92.17	65.89	4.06	8.81	0.00	0.00	0.00 na
7/17/2000 89 7/18/2000 90	0	29 29	1	96.67 0.0 96.67 0.0		20 20	5 5	80.00 80.00	0.00	0	24 24	1	96.00 96.00	0.00	1	25 25	0	100.0 100.0		93.17 93.17	80.11 80.11	4.48 4.48	9.61 9.61	0.00	0.00	0.00 na 0.00 na
7/19/2000 91	0	29	1	96.67 0.0	0 0	20	5	80.00	0.00	0	24	1	96.00	0.00	0	25	0	100.0	0.00	93.17	80.11	4.48	9.61	0.00	0.00	0.00 na
7/20/2000 92 7/24/2000 96	0	29 29	1	96.67 0.0 96.67 0.0		20 20	5	80.00 80.00	0.00	0	24 24	1	96.00 96.00	0.00	0	25 25	0	100.0		93.17 93.17	80.11 80.11	4.48 4.48	9.61 9.61	0.00	0.00	0.00 na 0.00 na
7/25/2000 97	Ō	29	1	96.67 0.0		20	5	80.00	0.00	Ō	24	1	96.00	0.00	Ō	25	ō	100.0		93.17	80.11	4.48	9.61	0.00	0.00	0.00 na
7/26/2000 98 7/27/2000 99	_	29 29	1	96.67 0.0 96.67 0.0	-	20 20	5 5	80.00 80.00	0.00	0	24 24	1	96.00 96.00	0.00	0	25 25	0	100.0		93.17 93.17	80.11 80.11	4.48 4.48	9.61 9.61	0.00	0.00	0.00 na 0.00 na
7/28/2000 10		29	1	96.67 0.0		20	5	80.00	0.00	0	24	1	96.00	0.00	0	25	ŏ	100.0	0.00	93.17	80.11	4.48	9.61	0.00	0.00	0.00 na
7/31/2000 10 8/1/2000 10		29 29	1	96.67 0.0 96.67 0.0		20 20	5 5	80.00 80.00	0.00	0	24 24	1	96.00 96.00	0.00	0	25 25	0	100.0 100.0		93.17 93.17	80.11 80.11	4.48 4.48	9.61 9.61	0.00	0.00	0.00 na 0.00 na
8/3/2000 10		29	1	96.67 0.0		20	5	80.00	0.00	0	24	1	96.00	0.00	0	25	0	100.0	0.00	93.17	80.11	4.48	9.61	0.00	0.00	0.00 na
8/4/2000 10 8/7/2000 11		29 29	1	96.67 0.0 96.67 0.0		20 20	5 5	80.00 80.00	0.00	0	24 24	1	96.00 96.00	0.00	0	25 25	0	100.0 100.0		93.17 93.17	80.11 80.11	4.48 4.48	9.61 9.61	0.00	0.00	0.00 na 0.00 na
8/8/2000 11		29	1	1 96.67 3.3		20	5	80.00	0.00	0	24	1	96.00	0.00	0	25	0	100.0		93.17	80.11	4.48	9.61	0.83	2.78	0.83 200.00
8/9/2000 11: 8/10/2000 11:		29 29	1	1 96.67 3.3 1 96.67 3.3		20 20	5 5	80.00 80.00	0.00	0	24 24	1	96.00 96.00	0.00	0	25 25	0	100.0 100.0		93.17 93.17	80.11 80.11	4.48 4.48	9.61 9.61	0.83	2.78 2.78	0.83 200.00 0.83 200.00
8/11/2000 11		29	1	1 96.67 3.3		20	5	80.00	0.00	0	24	1	96.00	0.00	0	25	Ō	100.0	0.00	93.17	80.11	4.48	9.61	0.83	2.78	0.83 200.00
8/14/2000 11	0	29	1	1 96.67 3.3	3 0	20	5	80.00	0.00	0	24	1	96.00	0.00	0	25	0	100.0	0.00	93.17	80.11	4.48	9.61	0.83	2.78	0.83 200.00

				EM	101-1					EMO	01-2					EN	M01-3					EI	/ 01-4				CUMULA	ATIVE		I	CUMULA	ATIVE	
	- 1 1	NO.	CUMUL.	CUMUL.	CUMUL.	%	%	NO.	CUMUL.	CUMUL.	CUMUL.	%	%	NO.	CUMUL.	CUMUL.	CUMUL.	%	%	NO.	CUMUL.	CUMUL	CUMUL.	%	%	MC	RTALITY S	STATIST	ICS	MET	AMORPH :	STATIST	rics
DATE D			DEAD	LIVE	METAM.	DEAD	METAM.	DEAD	DEAD	LIVE	METAM.	DEAD	METAM.	DEAD	DEAD	LIVE	METAM.	DEAD	METAM.	DEAD	DEAD	LIVE	METAM.	DEAD	METAM.	MEAN %	VAR (S2)	SEM	CV (%)	MEAN %	VAR (S2)	SEM	CV (%)
																													4. (/-/				4. (7.7)
8/15/2000 1	18	0	29	1	1	96.67	3.33	0	20	5		80.00	0.00	0	24	1		96.00	0.00	0	25	0		100.00	0.00	93.17	80.11	4.48	9.61	0.83	2.78	0.83	200.00
8/16/2000 1	19	0	29	1	1	96.67	3.33	0	20	5		80.00	0.00	0	24	1		96.00	0.00	0	25	0		100.00	0.00	93.17	80.11	4.48	9.61	0.83	2.78	0.83	200.00
8/17/2000 1	20	0	29	1	1	96.67	3.33	0	20	5		80.00	0.00	0	24	1		96.00	0.00	0	25	0		100.00	0.00	93.17	80.11	4.48	9.61	0.83	2.78	0.83	200.00
8/18/2000 1	21	0	29	1	1	96.67	3.33	0	20	5		80.00	0.00	0	24	1		96.00	0.00	0	25	0		100.00	0.00	93.17	80.11	4.48	9.61	0.83	2.78	0.83	200.00
8/21/2000 1	24	0	29	1	1	96.67	3.33	0	20	5		80.00	0.00	0	24	1		96.00	0.00	0	25	0		100.00	0.00	93.17	80.11	4.48	9.61	0.83	2.78	0.83	200.00
8/22/2000 1	25	0	29	1	1	96.67	3.33	0	20	5		80.00	0.00	0	24	1		96.00	0.00	0	25	0		100.00	0.00	93.17	80.11	4.48	9.61	0.83	2.78	0.83	200.00
8/23/2000 1	26	0	29	1	1	96.67	3.33	0	20	5		80.00	0.00	0	24	1		96.00	0.00	0	25	0		100.00	0.00	93.17	80.11	4.48	9.61	0.83	2.78	0.83	200.00
8/24/2000 1	27	0	29	1	1	96.67	3.33	0	20	5		80.00	0.00	0	24	1		96.00	0.00	0	25	0		100.00	0.00	93.17	80.11	4.48	9.61	0.83	2.78	0.83	200.00
8/25/2000 1	28	0	29	1	1	96.67	3.33	0	20	5		80.00	0.00	0	24	1		96.00	0.00	0	25	0		100.00	0.00	93.17	80.11	4.48	9.61	0.83	2.78	0.83	200.00
8/28/2000 1	31	0	29	1	1	96.67	3.33	0	20	5		80.00	0.00	0	24	1		96.00	0.00	0	25	0		100.00	0.00	93.17	80.11	4.48	9.61	0.83	2.78	0.83	200.00
8/29/2000 1	32	0	29	1	1	96.67	3.33	0	20	5	1	80.00	4.00	0	24	1		96.00	0.00	0	25	0		100.00	0.00	93.17	80.11	4.48	9.61	1.83	4.56	1.07	116.42
8/30/2000 1	33	0	29	1	1	96.67	3.33	0	20	5	1	80.00	4.00	0	24	1		96.00	0.00	0	25	0		100.00	0.00	93.17	80.11	4.48	9.61	1.83	4.56	1.07	116.42
8/31/2000 1	34	0	29	1	1	96.67	3.33	0	20	5	1	80.00	4.00	0	24	1		96.00	0.00	0	25	0		100.00	0.00	93.17	80.11	4.48	9.61	1.83	4.56	1.07	116.42
9/1/2000 1	35	0	29	1	1	96.67	3.33	0	20	5	1	80.00	4.00	0	24	1		96.00	0.00	0	25	0		100.00	0.00	93.17	80.11	4.48	9.61	1.83	4.56	1.07	116.42
9/5/2000 1	39	0	29	1	1	96.67	3.33	2	22	3	1	88.00	4.00	0	24	1		96.00	0.00	0	25	0		100.00	0.00	95.17	25.89	2.54	5.35	1.83	4.56	1.07	116.42
9/6/2000 1	40	0	29	1	1	96.67	3.33	0	22	3	1	88.00	4.00	0	24	1		96.00	0.00	0	25	0		100.00	0.00	95.17	25.89	2.54	5.35	1.83	4.56	1.07	116.42
9/7/2000 1	41	0	29	1	1	96.67	3.33	0	22	3	1	88.00	4.00	0	24	1		96.00	0.00	0	25	0		100.00	0.00	95.17	25.89	2.54	5.35	1.83	4.56	1.07	116.42
9/8/2000 1	42	0	29	1	1	96.67	3.33	0	22	3	1	88.00	4.00	0	24	1		96.00	0.00	0	25	0		100.00	0.00	95.17	25.89	2.54	5.35	1.83	4.56	1.07	116.42
9/11/2000 1	45	0	29	1	1	96.67	3.33	0	22	3	1	88.00	4.00	0	24	1		96.00	0.00	0	25	0		100.00	0.00	95.17	25.89	2.54	5.35	1.83	4.56	1.07	116.42
9/12/2000 1	46	0	29	1	1	96.67	3.33	0	22	3	1	88.00	4.00	0	24	1		96.00	0.00	0	25	0		100.00	0.00	95.17	25.89	2.54	5.35	1.83	4.56	1.07	116.42
9/13/2000 1	47	0	29	1	1	96.67	3.33	0	22	3	1	88.00	4.00	0	24	1		96.00	0.00	0	25	0		100.00	0.00	95.17	25.89	2.54	5.35	1.83	4.56	1.07	116.42
9/14/2000 1	48	0	29	1	1	96.67	3.33	0	22	3	1	88.00	4.00	0	24	1		96.00	0.00	0	25	0		100.00	0.00	95.17	25.89	2.54	5.35	1.83	4.56	1.07	116.42

DATE DAY		CUMUL. DEAD		102-1 CUMUL. % '	% NO.			02-2 . CUMUL. % METAM. DEA	% METAM		CUMUL. DEAD	EM02-3 CUMUL. CUMU LIVE METAN		% METAM.		CUMUL. DEAD	EM0 CUMUL. LIVE		% DEAD	% METAM		CUMULA ORTALITY : VAR (S2)	STATIST		MET MEAN %	CUMULA AMORPH	STATISTIC	CS CV (%)
DATE DAT	DEAD	DEAD	LIVE	METAM. DEAD ME	IAM. DEA) DEAD	LIVE	METAW. DEA	METAM	DEAD	DEAD	LIVE META	W. DEAD	METANI.	DEAD	DEAD	LIVE	METAM.	DEAD	METAM.	MEAN %	VAR (52)	SEIVI	CV (%)	MEAN %	VAR (52)	SEIVI	UV (76)
4/19/2000 0	0	0	30		.00 0	0	25	0.00	0.00	0	0	25	0.00	0.00	0	0	25		0.00	0.00	0.00	0.00	0.00	na	0.00	0.00	0.00	na
4/20/2000 1 4/21/2000 2	0	0	30		00 0	0	25	0.00	0.00	0	0	25 25	0.00	0.00	0	0	25		0.00	0.00	0.00	0.00	0.00	na	0.00	0.00	0.00	na
4/21/2000 2 4/24/2000 5	0	0	30 30		00 0	0	25 25	0.00	0.00	0	0	25 25	0.00	0.00	0	0	25 25		0.00	0.00	0.00	0.00	0.00	na na	0.00	0.00	0.00	na na
4/25/2000 6	0	ő	30		.00 0	0	25	0.00	0.00	ő	Ö	25	0.00	0.00	ő	Ö	25		0.00	0.00	0.00	0.00	0.00	na	0.00	0.00	0.00	na
4/26/2000 7	0	0	30		.00 0	0	25	0.00	0.00	0	0	25	0.00	0.00	0	0	25		0.00	0.00	0.00	0.00	0.00	na	0.00	0.00	0.00	na
4/27/2000 8 4/28/2000 9	0	0	30 30		00 0	0	25 25	0.00	0.00	0	0	25 25	0.00	0.00	0	0	25 25		0.00	0.00	0.00	0.00	0.00	na na	0.00	0.00	0.00	na na
5/1/2000 12	0	0	30		.00 0	0	25 25	0.00	0.00	0	0	25 25	0.00	0.00	0	0	25 25		0.00	0.00	0.00	0.00	0.00	na	0.00	0.00	0.00	na
5/2/2000 13	0	ō	30		.00 0	0	25	0.00	0.00	0	0	25	0.00	0.00	1	1	24		4.00	0.00	1.00	4.00	1.00	200.00	0.00	0.00	0.00	na
5/5/2000 16	17	17	13		.00 0	0	25	0.00	0.00	0	0	25	0.00	0.00	0	1	24		4.00	0.00	15.17	769.00	13.87	182.84	0.00	0.00	0.00	na
5/8/2000 19 5/9/2000 20	13	30 30	0		.00 0	0 6	25 19	0.00 24.0	0.00	0	2	23 23	8.00 8.00	0.00	3	4	21 21		16.00 16.00	0.00	31.00 37.00	2158.67 1806.67	23.23	149.88 114.88	0.00	0.00	0.00	na na
5/11/2000 22	0	30	0		.00 16	22	3	88.0		5	7	18	28.00	0.00	ő	4	21		16.00	0.00	58.00	1776.00	21.07	72.66	0.00	0.00	0.00	na
5/12/2000 23	0	30	0		.00 0	22	3	88.0		10	17	8	68.00	0.00	1	5	20		20.00	0.00	69.00	1241.33	17.62	51.06	0.00	0.00	0.00	na
5/15/2000 26	0	30 30	0		00 0	22	3	88.0		0	19 19	6	76.00	0.00	9	14 14	11 11		56.00	0.00	80.00	352.00	9.38	23.45	0.00	0.00	0.00	na
5/17/2000 28 5/19/2000 30	0	30	0		00 0	22 22	3	88.0 88.0		0	19	6	76.00 76.00	0.00	0	14	11		56.00 56.00	0.00	80.00 80.00	352.00 352.00	9.38 9.38	23.45 23.45	0.00	0.00	0.00	na na
5/22/2000 33	0	30	0	100.00 0	.00 1	23	2	92.0	0.00	0	19	6	76.00	0.00	1	15	10		60.00	0.00	82.00	314.67	8.87	21.63	0.00	0.00	0.00	na
5/23/2000 34	0	30	0		.00 0	23	2	92.0		0	19	6	76.00	0.00	0	15	10		60.00	0.00	82.00	314.67	8.87	21.63	0.00	0.00	0.00	na
5/24/2000 35 5/25/2000 36	0	30 30	0		00 0	23 23	2	92.0 92.0		0	19 19	6	76.00 76.00	0.00	0	15 15	10 10		60.00 60.00	0.00	82.00 82.00	314.67 314.67	8.87 8.87	21.63 21.63	0.00	0.00	0.00	na na
5/26/2000 37	0	30	0		.00 0	23	2	92.0		0	19	6	76.00	0.00	1	16	9		64.00	0.00	83.00	260.00	8.06	19.43	0.00	0.00	0.00	na
5/30/2000 41	0	30	0		.00 0	23	2	92.0		0	19	6	76.00	0.00	5	21	4		84.00	0.00	88.00	106.67	5.16	11.74	0.00	0.00	0.00	na
5/31/2000 42 6/1/2000 43	0	30 30	0		00 0	23 23	2	92.0 92.0		0	19 19	6	76.00 76.00	0.00	0	21 21	4		84.00 84.00	0.00	88.00 88.00	106.67 106.67	5.16 5.16	11.74 11.74	0.00	0.00	0.00	na na
6/2/2000 44	0	30	0		.00 0	23	2	92.0		0	19	6	76.00	0.00	0	21	4		84.00	0.00	88.00	106.67	5.16	11.74	0.00	0.00	0.00	na
6/5/2000 47	0	30	0		.00 0	23	2	92.0		1	20	5	80.00	0.00	0	21	4		84.00	0.00	89.00	78.67	4.43	9.97	0.00	0.00	0.00	na
6/6/2000 48	0	30	0		00 0	23	2	92.0		0	20	5	80.00	0.00	0	21	4		84.00	0.00	89.00	78.67	4.43	9.97	0.00	0.00	0.00	na
6/8/2000 50 6/12/2000 54	0	30 30	0		00 0	23 23	2	92.0 92.0		0	20 22	5	80.00 88.00	0.00	0	21 22	3		84.00 88.00	0.00	89.00 92.00	78.67 32.00	4.43 2.83	9.97 6.15	0.00	0.00	0.00	na na
6/13/2000 55	0	30	0		.00 0	23	2	92.0	0.00	0	22	3	88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
6/14/2000 56	0	30	0		.00 0	23	2	92.0		0	22	3	88.00	0.00	0	22	3		88.00 88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
6/15/2000 57 6/16/2000 58	0	30 30	0		00 0	23 23	2	92.0 92.0		0	22 22	3	88.00 88.00	0.00	0	22 22	3		88.00	0.00	92.00 92.00	32.00 32.00	2.83 2.83	6.15 6.15	0.00	0.00	0.00	na na
6/19/2000 61	0	30	Ö	100.00 0	.00 0	23	2	92.0		ő	22	3	88.00	0.00	ő	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
6/20/2000 62	0	30	0		.00 0	23	2	92.0		0	22	3	88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
6/21/2000 63 6/22/2000 64	0	30 30	0		00 0	23 23	2	92.0 92.0		0	22 22	3	88.00 88.00	0.00	0	22 22	3		88.00 88.00	0.00	92.00 92.00	32.00 32.00	2.83 2.83	6.15 6.15	0.00	0.00	0.00	na na
6/23/2000 65	0	30	Ö		.00 0	23	2	92.0		ő	22	3	88.00	0.00	ő	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
6/26/2000 68	0	30	0		.00 0	23	2	92.0		0	22	3	88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
6/27/2000 69 6/28/2000 70	0	30 30	0		00 0	23 23	2	92.0 92.0		0	22 22	3	88.00 88.00	0.00	0	22 22	3		88.00 88.00	0.00	92.00 92.00	32.00 32.00	2.83	6.15 6.15	0.00	0.00	0.00	na na
6/29/2000 71	0	30	Ö		.00 0	23	2	92.0		ő	22	3	88.00	0.00	ő	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
6/30/2000 72	0	30	0		.00 0	23	2	92.0		0	22	3	88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
7/5/2000 77 7/6/2000 78	0	30 30	0		00 0	23 23	2	92.0 92.0		0	22 22	3	88.00 88.00	0.00	0	22 22	3		88.00 88.00	0.00	92.00 92.00	32.00 32.00	2.83	6.15 6.15	0.00	0.00	0.00	na na
7/7/2000 79	0	30	0		.00 0	23	2	92.0		0	22	3	88.00	0.00	ő	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
7/10/2000 82	0	30	0		.00 0	23	2	92.0		0	22	3	88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
7/11/2000 83 7/12/2000 84	0	30 30	0		00 0	23 23	2	92.0 92.0		0	22 22	3	88.00 88.00	0.00	0	22 22	3		88.00 88.00	0.00	92.00 92.00	32.00 32.00	2.83 2.83	6.15 6.15	0.00	0.00	0.00	na na
7/13/2000 85	0	30	Ö		.00 0	23	2	92.0		ő	22	3	88.00	0.00	ő	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
7/17/2000 89	0	30	0		.00 0	23	2	92.0		0	22	3	88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
7/18/2000 90 7/19/2000 91	0	30 30	0		00 0	23	2	92.0 92.0		0	22	3	88.00 88.00	0.00	0	22 22	3		88.00 88.00	0.00	92.00 92.00	32.00 32.00	2.83	6.15	0.00	0.00	0.00	na
7/19/2000 91 7/20/2000 92	0	30	0		00 0	23 23	2	92.0		0	22 22	3	88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15 6.15	0.00	0.00	0.00	na na
7/24/2000 96	0	30	0		.00 0	23	2	92.0		0	22	3	88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
7/25/2000 97 7/26/2000 98	0	30 30	0		00 0	23 23	2	92.0 92.0		0	22 22	3	88.00 88.00	0.00	0	22 22	3		88.00 88.00	0.00	92.00 92.00	32.00 32.00	2.83	6.15 6.15	0.00	0.00	0.00	na
7/27/2000 99	0	30	0		00 0	23	2	92.0		0	22	3	88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na na
7/28/2000 100	ő	30	ō	100.00 0	.00 0	23	2	92.0	0.00	ő	22	3	88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
7/31/2000 103 8/1/2000 104	0	30 30	0		00 0	23	2	92.0		0	22	3	88.00 88.00	0.00	0	22	3		88.00 88.00	0.00	92.00 92.00	32.00 32.00	2.83	6.15 6.15	0.00	0.00	0.00	na
8/1/2000 104 8/3/2000 106	0	30	0		00 0	23 23	2	92.0 92.0		0	22 22	3	88.00 88.00	0.00	0	22 22	3		88.00	0.00	92.00	32.00 32.00	2.83 2.83	6.15 6.15	0.00	0.00	0.00	na na
8/4/2000 107	0	30	0	100.00 0	.00 0	23	2	92.0	0.00	0	22	3	88.00	0.00	ō	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
8/7/2000 110	0	30	0		.00 0	23	2	92.0		0	22	3	88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
8/8/2000 111 8/9/2000 112	0	30 30	0		00 0	23 23	2	92.0 92.0		0	22 22	3	88.00 88.00	0.00	0	22 22	3		88.00 88.00	0.00	92.00 92.00	32.00 32.00	2.83	6.15 6.15	0.00	0.00	0.00	na na
8/10/2000 113	0	30	0		.00 0	23	2	92.0	0.00	0	22	3	88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
8/11/2000 114	0	30	0		00 0	23	2	92.0 92.0		0	22	3	88.00 88.00	0.00	0	22	3		88.00 88.00	0.00	92.00 92.00	32.00 32.00	2.83	6.15	0.00	0.00	0.00	na
8/14/2000 117	0	30	0	100.00 0	.00 0	23	2	92.0	0.00	0	22	3	08.00	0.00	0	22	3		00.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na

			EM	02-1					EMO	02-2					EM	02-3					EN	102-4				CUMULA	ATIVE		l	CUMUL	ATIVE	
	NO.	CUMUL.	CUMUL.	CUMUL.	%	%	NO.	CUMUL.	CUMUL.	CUMUL.	%	%	NO.	CUMUL.	CUMUL.	CUMUL.	%	%	NO.	CUMUL.	. CUMUL.	CUMUL.	%	%	MO	RTALITY S	STATIST	ICS	MET	AMORPH	STATIST	ICS
DATE DAY	DEAD	DEAD	LIVE	METAM.	DEAD	METAM.	DEAD	DEAD	LIVE	METAM.	DEAD	METAM.	DEAD	DEAD	LIVE	METAM.	DEAD	METAM.	DEAD	DEAD	LIVE	METAM.	DEAD	METAM.	MEAN %	VAR (S2)	SEM	CV (%)	MEAN %	VAR (S2)	SEM	CV (%)
8/15/2000 118	0	30	0		100.00	0.00	0	23	2		92.00	0.00	0	22	3		88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
8/16/2000 119	0	30	0		100.00	0.00	0	23	2		92.00	0.00	0	22	3		88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
8/17/2000 120	0	30	0		100.00	0.00	0	23	2		92.00	0.00	0	22	3		88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
8/18/2000 121	0	30	0		100.00	0.00	0	23	2		92.00	0.00	Ó	22	3		88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
8/21/2000 124	0	30	0		100.00	0.00	0	23	2		92.00	0.00	0	22	3		88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
8/22/2000 125	Ö	30	0		100.00	0.00	Ó	23	2		92.00	0.00	Ó	22	3		88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
8/23/2000 126	0	30	0		100.00	0.00	0	23	2		92.00	0.00	0	22	3		88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
8/24/2000 127	Ö	30	0		100.00	0.00	Ó	23	2		92.00	0.00	Ó	22	3		88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
8/25/2000 128	Ö	30	0		100.00	0.00	Ó	23	2		92.00	0.00	Ó	22	3		88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
8/28/2000 131	0	30	0		100.00	0.00	0	23	2		92.00	0.00	0	22	3		88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
8/29/2000 132	0	30	0		100.00	0.00	0	23	2		92.00	0.00	Ó	22	3		88.00	0.00	0	22	3		88.00	0.00	92.00	32.00	2.83	6.15	0.00	0.00	0.00	na
8/30/2000 133	0	30	0		100.00	0.00	1	24	1		96.00	0.00	1	23	2		92.00	0.00	0	22	3		88.00	0.00	94.00	26.67	2.58	5.49	0.00	0.00	0.00	na
8/31/2000 134	Ö	30	0		100.00	0.00	0	24	1		96.00	0.00	0	23	2		92.00	0.00	0	22	3		88.00	0.00	94.00	26.67	2.58	5.49	0.00	0.00	0.00	na
9/1/2000 135	0	30	0		100.00	0.00	0	24	1		96.00	0.00	0	23	2		92.00	0.00	1	23	2		92.00	0.00	95.00	14.67	1.91	4.03	0.00	0.00	0.00	na
9/5/2000 139	Ö	30	0		100.00	0.00	1	25	0		100.00	0.00	Ó	23	2		92.00	0.00	0	23	2		92.00	0.00	96.00	21.33	2.31	4.81	0.00	0.00	0.00	na
9/6/2000 140	0	30	0		100.00	0.00	0	25	0		100.00	0.00	Ó	23	2		92.00	0.00	0	23	2		92.00	0.00	96.00	21.33	2.31	4.81	0.00	0.00	0.00	na
9/7/2000 141	0	30	0		100.00	0.00	0	25	0		100.00	0.00	0	23	2		92.00	0.00	0	23	2		92.00	0.00	96.00	21.33	2.31	4.81	0.00	0.00	0.00	na
9/8/2000 142	0	30	0		100.00	0.00	0	25	0		100.00	0.00	Ó	23	2		92.00	0.00	0	23	2		92.00	0.00	96.00	21.33	2.31	4.81	0.00	0.00	0.00	na
9/11/2000 145	0	30	0		100.00	0.00	0	25	0		100.00	0.00	0	23	2		92.00	0.00	0	23	2		92.00	0.00	96.00	21.33	2.31	4.81	0.00	0.00	0.00	na
9/12/2000 146	ō	30	Ó		100.00	0.00	Ó	25	ō		100.00	0.00	ō	23	2		92.00	0.00	ó	23	2		92.00	0.00	96.00	21.33	2.31	4.81	0.00	0.00	0.00	na
9/13/2000 147	0	30	0		100.00	0.00	0	25	0		100.00	0.00	0	23	2		92.00	0.00	0	23	2		92.00	0.00	96.00	21.33	2.31	4.81	0.00	0.00	0.00	na
9/14/2000 148	ō	30	Ó		100.00	0.00	Ó	25	ō		100.00	0.00	ō	23	2		92.00	0.00	ó	23	2		92.00	0.00	96.00	21.33	2.31	4.81	0.00	0.00	0.00	na
	-																															

COMBINED EGG MASSES

													COM	BINED E	GG MAS	SSES															
						1 110	0.000									01	0/ 1					01			MEA				MEAN		
				CUMUL.				CUMUL.			%				CUMUL.		%		CUMUL.				%		RTALITY S				AMORPH S		
DATE DAY	DEAD	DEAD	LIVE	METAM.	DEAD MET	M. DEAL	DEAD	LIVE	METAM	. DEAD	METAM.	DEAD	DEAD	LIVE	METAM.	DEAD	METAM.	DEAD	DEAD	LIVE	METAM.	DEAD	METAM.	MEAN %	VAR (S2)	SEM	CV (%)	MEAN %	VAR (S2)	SEM (CV (%)
4/19/2000 0																								0.00	0.00	0.00	na	0.00	0.00	0.00	na
4/20/2000 1																								0.00	0.00	0.00	na	0.00	0.00	0.00	na
4/21/2000 2																								0.00	0.00	0.00	na	0.00	0.00	0.00	na
4/24/2000 5																								0.00	0.00	0.00	na	0.00	0.00	0.00	na
4/25/2000 6																								1.92	7.35		141.42	0.00	0.00	0.00	na
4/26/2000 7																								16.67	555.56		141.42	0.00	0.00	0.00	na
4/27/2000 8																								22.67	1027.56		141.42	0.00	0.00	0.00	na
4/28/2000 9																								24.17			141.42	0.00	0.00	0.00	na
5/1/2000 12																								25.17	1266.72		141.42	0.00	0.00	0.00	na
5/2/2000 13																								27.08	1360.68	26.08	136.20	0.00	0.00	0.00	na
5/5/2000 16																								37.58	1005.01	22.42	84.35	0.00	0.00	0.00	na
5/8/2000 19 5/9/2000 20																								47.33 55.33	533.56 672.22	16.33 18.33	48.80 46.86	0.00	0.00	0.00	na na
5/11/2000 22																								70.17	296.06	12.17	24.52	0.00	0.00	0.00	na
5/12/2000 23																								76.08	100.35	7.08	13 17	0.00	0.00	0.00	na
5/15/2000 26																								84.58	42.01	4.58	7.66	0.00	0.00	0.00	na
5/17/2000 28																								84.58	42.01	4.58	7.66	0.00	0.00	0.00	na
5/19/2000 30																								84.58	42.01	4.58	7.66	0.00	0.00	0.00	na
5/22/2000 33																								85.58	25.68	3.58	5.92	0.00	0.00	0.00	na
5/23/2000 34																								85.58	25.68	3.58	5.92	0.00	0.00	0.00	na
5/24/2000 35																								85.58	25.68	3.58	5.92	0.00	0.00	0.00	na
5/25/2000 36																								85.58	25.68	3.58	5.92	0.00	0.00	0.00	na
5/26/2000 37 5/30/2000 41																								86.08 88.58	19.01 0.68	3.08 0.58	5.07 0.93	0.00	0.00	0.00	na
5/31/2000 42																								88.58	0.68	0.58	0.93	0.00	0.00	0.00	na na
6/1/2000 43																								88.58	0.68	0.58	0.93	0.00	0.00	0.00	na
6/2/2000 44																								88.58	0.68	0.58	0.93	0.00	0.00	0.00	na
6/5/2000 47																								89.58	0.68	0.58	0.92	0.00	0.00	0.00	na
6/6/2000 48																								90.08	2.35	1.08	1.70	0.00	0.00	0.00	na
6/8/2000 50																								90.08	2.35	1.08	1.70	0.00	0.00	0.00	na
6/12/2000 54																								92.08	0.01	0.08	0.13	0.00	0.00	0.00	na
6/13/2000 55																								92.08	0.01	0.08	0.13	0.00	0.00	0.00	na
6/14/2000 56																								92.08	0.01	0.08	0.13	0.00	0.00	0.00	na
6/15/2000 57 6/16/2000 58																								92.08 92.08	0.01 0.01	0.08	0.13	0.00	0.00	0.00	na na
6/19/2000 56																								92.08	0.01	0.08	0.13	0.00	0.00	0.00	na
6/20/2000 62																								92.08	0.01	0.08	0.13	0.00	0.00	0.00	na
6/21/2000 63																								92.08	0.01	0.08	0.13	0.00	0.00	0.00	na
6/22/2000 64																								92.08	0.01	0.08	0.13	0.00	0.00	0.00	na
6/23/2000 65																								92.08	0.01	0.08	0.13	0.00	0.00	0.00	na
6/26/2000 68																								92.08	0.01	0.08	0.13	0.00	0.00	0.00	na
6/27/2000 69																								92.08	0.01	0.08	0.13	0.00	0.00	0.00	na
6/28/2000 70 6/29/2000 71																								92.08 92.08	0.01 0.01	0.08	0.13	0.00	0.00	0.00	na
6/30/2000 71																								92.08	0.01	0.08	0.13	0.00	0.00	0.00	na na
7/5/2000 77																								92.08	0.01	0.08	0.13	0.00	0.00	0.00	na
7/6/2000 78																								92.08	0.01	0.08	0.13	0.00	0.00	0.00	na
7/7/2000 79																								92.08	0.01	0.08	0.13	0.00	0.00	0.00	na
7/10/2000 82												1												92.08	0.01	0.08	0.13	0.00	0.00	0.00	na
7/11/2000 83												1												92.08	0.01	0.08	0.13	0.00	0.00	0.00	na
7/12/2000 84												1												92.08	0.01	0.08	0.13	0.00	0.00	0.00	na
7/13/2000 85												1												92.08	0.01	0.08	0.13	0.00	0.00	0.00	na
7/17/2000 89 7/18/2000 90												1												92.58 92.58	0.68	0.58	0.89	0.00	0.00	0.00	na na
7/18/2000 90												1												92.58	0.68	0.58	0.89	0.00	0.00	0.00	na na
7/20/2000 92												l												92.58	0.68	0.58	0.89	0.00	0.00	0.00	na
7/24/2000 96												1												92.58	0.68	0.58	0.89	0.00	0.00	0.00	na
7/25/2000 97												1												92.58	0.68	0.58	0.89	0.00	0.00	0.00	na
7/26/2000 98												l												92.58	0.68	0.58	0.89	0.00	0.00	0.00	na
7/27/2000 99												1												92.58	0.68	0.58	0.89	0.00	0.00	0.00	na
7/28/2000 100												1												92.58	0.68	0.58	0.89	0.00	0.00	0.00	na
7/31/2000 103												l												92.58	0.68	0.58	0.89	0.00	0.00	0.00	na
8/1/2000 104												1												92.58	0.68	0.58	0.89	0.00	0.00	0.00	na
8/3/2000 106												1												92.58	0.68	0.58	0.89	0.00	0.00	0.00	na
8/4/2000 107 8/7/2000 110												l												92.58 92.58	0.68 0.68	0.58	0.89	0.00	0.00	0.00	na na
8/8/2000 110												1												92.58	0.68	0.58	0.89	0.00	0.35		141.42
8/9/2000 111												1												92.58	0.68	0.58	0.89	0.42	0.35		141.42
8/10/2000 113												l												92.58	0.68	0.58	0.89	0.42	0.35		141.42
8/11/2000 114												1												92.58	0.68	0.58	0.89	0.42	0.35	0.42	141.42
8/14/2000 117						•																		92.58	0.68	0.58	0.89	0.42	0.35	0.42	141.42

COMBINED EGG MASSES

		0.00.00				01		01111111			01				0.114.11		01	01	1	01.04.0			01			MEA				MEA		
		CUMUL.			- %	%	NO.	CUMUL.	CUMUL.	CUMUL.	- %	%				CUMUL.	%	%	NO.			CUMUL.	%	%		RTALITY S				AMORPH		
DATE DAY	DEAL) DEAD	LIVE	METAM.	DEAD	METAM.	DEAD	DEAD	LIVE	METAM.	DEAD	METAM.	DEAD	DEAD	LIVE	METAM.	DEAD	METAM.	DEAL	DEAD	LIVE	METAM.	DEAD	METAM.	MEAN %	VAR (S2)	SEM	CV (%)	MEAN %	VAR (S2)	SEM	CV (%)
8/15/2000 118																									92.58	0.68	0.29	0.89	0.42	0.35	0.21	141.42
8/16/2000 119																									92.58	0.68	0.29	0.89	0.42	0.35	0.21	141.42
8/17/2000 120																									92.58	0.68	0.29	0.89	0.42	0.35	0.21	141.42
8/18/2000 121																									92.58	0.68	0.29	0.89	0.42	0.35	0.21	141.42
8/21/2000 124																									92.58	0.68	0.29	0.89	0.42	0.35	0.21	141.42
8/22/2000 125																									92.58	0.68	0.29	0.89	0.42	0.35	0.21	141.42
8/23/2000 126																									92.58	0.68	0.29	0.89	0.42	0.35	0.21	141.42
8/24/2000 127																									92.58	0.68	0.29	0.89	0.42	0.35	0.21	141.42
8/25/2000 128																									92.58	0.68	0.29	0.89	0.42	0.35	0.21	141.42
8/28/2000 131																									92.58	0.68	0.29	0.89	0.42	0.35	0.21	141.42
8/29/2000 132																									92.58	0.68	0.29	0.89	0.92	1.68	0.46	141.42
8/30/2000 133																									93.58	0.35	0.21	0.63	0.92	1.68	0.46	141.42
8/31/2000 134																									93.58	0.35	0.21	0.63	0.92	1.68	0.46	141.42
9/1/2000 135																									94.08	1.68	0.46	1.38	0.92	1.68	0.46	141.42
9/5/2000 139																									95.58	0.35	0.21	0.62	0.92	1.68	0.46	141.42
9/6/2000 140																									95.58	0.35	0.21	0.62	0.92	1.68	0.46	141.42
9/7/2000 141																									95.58	0.35	0.21	0.62	0.92	1.68	0.46	141.42
9/8/2000 142																									95.58	0.35	0.21	0.62	0.92	1.68	0.46	141.42
9/11/2000 145																									95.58	0.35	0.21	0.62	0.92	1.68	0.46	141.42
9/12/2000 146																									95.58	0.35	0.21	0.62	0.92	1.68	0.46	141.42
9/13/2000 147																									95.58	0.35	0.21	0.62	0.92	1.68	0.46	141.42
9/14/2000 148	3																								95.58	0.35	0.21	0.62	0.92	1.68	0.46	141.42

				TP01-1	ı				CUMUL	ATIVE		I	CUMULA	TIVE	
		NO.	CUMUL.	CUMUL.	CUMUL.	%	%	M	ORTALITY	STATISTIC	cs	N	IETAMORPH S	STATISTICS	j
DATE	DAY	DEAD	DEAD	LIVE	METAM.	DEAD	METAM.	MEAN %	VAR (S2)	SEM	CV (%)	MEAN %	VAR (S2)	SEM	CV (%)
5/9/2000	0	0	0	10		0.00	0.00	0.00	na	na	na	0.00	na	na	na
5/11/2000	2	0	0	10		0.00	0.00	0.00	na	na	na	0.00	na	na	na
5/12/2000	3	1	1	9		10.00	0.00	10.00	na	na	na	0.00	na	na	na
5/15/2000	6	0	1	9		10.00	0.00	10.00	na	na	na	0.00	na	na	na
5/17/2000	8	0	1	9		10.00	0.00	10.00	na	na	na	0.00	na	na	na
5/19/2000	10	0	1	9		10.00	0.00	10.00	na	na	na	0.00	na	na	na
5/22/2000	13	0	1	9		10.00	0.00	10.00	na	na	na	0.00	na	na	na
5/23/2000	14	0	1	9		10.00	0.00	10.00	na	na	na	0.00	na	na	na
5/24/2000	15	0	1	9		10.00	0.00	10.00	na	na	na	0.00	na	na	na
5/25/2000	16	0	1	9		10.00	0.00	10.00	na	na	na	0.00	na	na	na
5/26/2000	17	1	2	8		20.00	0.00	20.00	na	na	na	0.00	na	na	na
5/30/2000	21	5	7	3		70.00	0.00	70.00	na	na	na	0.00	na	na	na
5/31/2000	22	0	7	3		70.00	0.00	70.00	na	na	na	0.00	na	na	na
6/1/2000	23	2	9	1		90.00	0.00	90.00	na	na	na	0.00	na	na	na
6/2/2000	24	0	9	1		90.00	0.00	90.00	na	na	na	0.00	na	na	na
6/5/2000	27	0	9	1		90.00	0.00	90.00	na	na	na	0.00	na	na	na
6/6/2000	28	1	10	0		100.00	0.00	100.00	na	na	na	0.00	na	na	na
		l						l							

ı	NO	CUMUI	EM01-1 CUMUL. CUMU	ı %	%	l NO	CUMUI	EM0°		0/_	%	l NO	CUMUI	EM01-		%	%	NO	CUMUI	EMICUMUL.	01-4 CUMUII	%	%	MOE	CUMULA		ıre		CUMULA.	TIVE TATISTICS
DATE DAY			LIVE METAN					LIVE N						LIVE M					DEAD	LIVE	METAM.									SEM CV (%)
4/25/2000 0	0	0	30	0.00	0.00	0	0	25		0.00	0.00	0	0	25		0.00	0.00	0	0	25		0.00	0.00	0.00	0.00	0.00	na	0.00	0.00	0.00 na
4/26/2000 1	0	0	30	0.00	0.00	0	0	25 25			0.00	0	0	25		0.00	0.00	0	0	25 25		0.00	0.00	0.00	0.00	0.00	na	0.00	0.00	0.00 na
4/27/2000 2	0	0	30	0.00	0.00	0	0	25			0.00	0	0	25		0.00	0.00	0	0	25		0.00	0.00	0.00	0.00	0.00	na	0.00	0.00	0.00 na
4/28/2000 3 5/1/2000 6	0	0	30 30	0.00	0.00	0	0	25 25			0.00	0	0	25 25		0.00	0.00	0	0	25 25		0.00	0.00	0.00	0.00	0.00	na na	0.00	0.00	0.00 na 0.00 na
5/2/2000 7	0	0	30	0.00	0.00	0	0	25		0.00	0.00	0	0	25		0.00	0.00	0	0	25		0.00	0.00	0.00	0.00	0.00	na	0.00	0.00	0.00 na
5/5/2000 10 5/8/2000 13	0	0	30 30	0.00	0.00	0	0	25 25			0.00	3 5	3	22 17		12.00 32.00	0.00	6 4	6 10	19 15		24.00 40.00	0.00	9.00 18.00	132.00 442.67	5.74 10.52	127.66 116.89	0.00	0.00	0.00 na 0.00 na
5/9/2000 14	13	13	17	43.33	0.00	13	13	12			0.00	6	14	11		56.00	0.00	0	10	15		40.00	0.00	47.83	55.22	3.72	15.54	0.00	0.00	0.00 na
5/11/2000 16 5/12/2000 17	8	21 22	9	70.00 73.33	0.00	8	21 22	4			0.00	3	17 20	8 5		38.00 30.00	0.00	0	10 11	15 14		40.00 44.00	0.00	65.50 71.33	339.67 368.00	9.22 9.59	28.14 26.89	0.00	0.00	0.00 na 0.00 na
5/15/2000 17	1	23	7	76.67	0.00	3	25	0			0.00	4	24	1		96.00	0.00	0	11	14		44.00	0.00	79.17	653.44	12.78	32.29	0.00	0.00	0.00 na
5/17/2000 22	2	25	5	83.33	0.00	0	25	0			0.00	0	24	1		96.00	0.00	2	13	12		52.00	0.00	82.83	473.00	10.87	26.26	0.00	0.00	0.00 na
5/19/2000 24 5/22/2000 27	0	25 25	5 5	83.33 83.33	0.00	0	25 25	0			0.00	0	24 24	1		96.00 96.00	0.00	0	13 13	12 12		52.00 52.00	0.00	82.83 82.83	473.00 473.00	10.87 10.87	26.26 26.26	0.00	0.00	0.00 na 0.00 na
5/23/2000 28	1	26	4	86.67	0.00	0	25	0			0.00	0	24	1		96.00	0.00	0	13	12		52.00	0.00	83.67	476.89	10.92	26.10	0.00	0.00	0.00 na
5/24/2000 29 5/25/2000 30	0	26 26	4	86.67 86.67	0.00	0	25 25	0			0.00	0	24 24	1		96.00 96.00	0.00	0	13 13	12 12		52.00 52.00	0.00	83.67 83.67	476.89 476.89	10.92 10.92		0.00	0.00	0.00 na 0.00 na
5/26/2000 31	0	26	4	86.67	0.00	0	25	0	1	00.00	0.00	0	24	i	9	96.00	0.00	0	13	12		52.00	0.00	83.67	476.89	10.92	26.10	0.00	0.00	0.00 na
5/30/2000 35 5/31/2000 36	0	26 26	4	86.67 86.67	0.00	0	25 25	0			0.00	0	24 24	1		96.00 96.00	0.00	1 0	14 14	11 11		56.00 56.00	0.00	84.67 84.67	396.44 396.44	9.96 9.96	23.52 23.52	0.00	0.00	0.00 na 0.00 na
6/1/2000 37	0	26	4	86.67	0.00	0	25	0			0.00	0	24	1		96.00	0.00	0	14	11		56.00	0.00	84.67	396.44	9.96	23.52	0.00	0.00	0.00 na
6/2/2000 38	0	26	4	86.67	0.00	0	25	0			0.00	0	24 24	1		96.00	0.00	0	14	11		56.00	0.00	84.67	396.44	9.96	23.52	0.00	0.00	0.00 na
6/5/2000 41 6/6/2000 42	0	26 26	4	86.67 86.67	0.00	0	25 25	0			0.00	0	24	1		96.00 96.00	0.00	0	14 14	11 11		56.00 56.00	0.00	84.67 84.67	396.44 396.44	9.96 9.96	23.52 23.52	0.00	0.00	0.00 na 0.00 na
6/8/2000 44	0	26	4	86.67	0.00	0	25	0	1	00.00	0.00	0	24	1		96.00	0.00	0	14	11		56.00	0.00	84.67	396.44	9.96	23.52	0.00	0.00	0.00 na
6/12/2000 48 6/13/2000 49	0	26 26	4	86.67 86.67	0.00	0	25 25	0			0.00	0	24 24	1		96.00 96.00	0.00	0	14 14	11 11		56.00 56.00	0.00	84.67 84.67	396.44 396.44	9.96 9.96	23.52 23.52	0.00	0.00	0.00 na 0.00 na
6/14/2000 50	0	26	4	86.67	0.00	0	25	0	1	00.00	0.00	0	24	i	9	96.00	0.00	0	14	11		56.00	0.00	84.67	396.44	9.96	23.52	0.00	0.00	0.00 na
6/15/2000 51 6/16/2000 52	0	26 26	4	86.67 86.67	0.00	0	25 25	0			0.00	0	24 24	1		96.00 96.00	0.00	0	14 14	11 11		56.00 56.00	0.00	84.67 84.67	396.44 396.44	9.96 9.96	23.52 23.52	0.00	0.00	0.00 na 0.00 na
6/19/2000 55	0	26	4	86.67	0.00	0	25 25	0			0.00	0	24	1		96.00	0.00	0	14	11		56.00	0.00	84.67	396.44	9.96	23.52	0.00	0.00	0.00 na
6/20/2000 56	0	26	4	86.67	0.00	0	25	0			0.00	0	24	1		96.00	0.00	0	14	11		56.00	0.00	84.67	396.44	9.96	23.52	0.00	0.00	0.00 na
6/21/2000 57 6/22/2000 58	0	26 26	4	86.67 86.67	0.00	0	25 25	0			0.00	0	24 24	1		96.00 96.00	0.00	0	14 14	11 11		56.00 56.00	0.00	84.67 84.67	396.44 396.44	9.96 9.96	23.52 23.52	0.00	0.00	0.00 na 0.00 na
6/23/2000 59	0	26	4	86.67	0.00	0	25	0	1	00.00	0.00	0	24	1	9	96.00	0.00	0	14	11		56.00	0.00	84.67	396.44	9.96	23.52	0.00	0.00	0.00 na
6/26/2000 62 6/27/2000 63	0	26 26	4	86.67 86.67	0.00	0	25 25	0			0.00	0	24 25	1		96.00 00.00	0.00	0	14 14	11 11		56.00 56.00	0.00	84.67 85.67	396.44 430.67	9.96 10.38	23.52 24.22	0.00	0.00	0.00 na 0.00 na
6/28/2000 64	0	26	4	86.67	0.00	0	25	0			0.00	0	25	0		00.00	0.00	0	14	11		56.00	0.00	85.67	430.67	10.38	24.22	0.00	0.00	0.00 na
6/29/2000 65 6/30/2000 66	0	26 26	4	86.67 86.67	0.00	0	25 25	0			0.00	0	25 25	0		00.00	0.00	0	14 14	11 11		56.00 56.00	0.00	85.67 85.67	430.67 430.67	10.38	24.22	0.00	0.00	0.00 na 0.00 na
7/5/2000 71	0	26	4	86.67	0.00	0	25	0			0.00	0	25 25	0		00.00	0.00	0	14	11		56.00	0.00	85.67	430.67	10.38 10.38	24.22 24.22	0.00	0.00	0.00 na 0.00 na
7/6/2000 72	0	26	4	86.67	0.00	0	25	0			0.00	0	25	0		00.00	0.00	0	14	11		56.00	0.00	85.67	430.67	10.38	24.22	0.00	0.00	0.00 na
7/7/2000 73 7/10/2000 76	0	26 26	4	86.67 86.67	0.00	0	25 25	0			0.00	0	25 25	0		00.00	0.00	0	14 14	11 11		56.00 56.00	0.00	85.67 85.67	430.67 430.67	10.38 10.38	24.22 24.22	0.00	0.00	0.00 na 0.00 na
7/11/2000 77	0	26	4	86.67	0.00	0	25	ō	1	00.00	0.00	0	25	0	1	00.00	0.00	0	14	11		56.00	0.00	85.67	430.67	10.38	24.22	0.00	0.00	0.00 na
7/12/2000 78 7/13/2000 79	0	26 26	4	86.67 86.67	0.00	0	25 25	0			0.00	0	25 25	0		00.00	0.00	0	14 14	11 11		56.00 56.00	0.00	85.67 85.67	430.67 430.67	10.38 10.38	24.22 24.22	0.00	0.00	0.00 na 0.00 na
7/17/2000 83	0	26	4	86.67	0.00	0	25	0			0.00	0	25	0		00.00	0.00	0	14	11		56.00	0.00	85.67	430.67	10.38	24.22	0.00	0.00	0.00 na
7/18/2000 84	0	26	4 4	86.67	0.00	0	25 25	0			0.00	0	25 25	0		00.00	0.00	0	14 14	11		56.00	0.00	85.67	430.67	10.38	24.22	0.00	0.00	0.00 na
7/19/2000 85 7/20/2000 86	0	26 26	4	86.67 86.67	0.00	0	25 25	0			0.00	0	25 25	0		00.00	0.00	0	14	11 11		56.00 56.00	0.00	85.67 85.67	430.67 430.67	10.38 10.38	24.22 24.22	0.00	0.00	0.00 na 0.00 na
7/21/2000 87	0	26	4	86.67	0.00	0	25	0			0.00	0	25	0		00.00	0.00	0	14	11		56.00	0.00	85.67	430.67	10.38	24.22	0.00	0.00	0.00 na
7/24/2000 90 7/25/2000 91	0	26 26	4	86.67 86.67	0.00	0	25 25	0			0.00	0	25 25	0		00.00	0.00	0	14 14	11 11		56.00 56.00	0.00	85.67 85.67	430.67 430.67	10.38	24.22	0.00	0.00	0.00 na 0.00 na
7/26/2000 92	0	26	4	86.67	0.00	0	25	ō			0.00	0	25	0		00.00	0.00	0	14	11		56.00	0.00	85.67	430.67	10.38	24.22	0.00	0.00	0.00 na
7/27/2000 93 7/28/2000 94	0	26 26	4	86.67 86.67	0.00	0	25 25	0			0.00	0	25 25	0		00.00	0.00	0	14 14	11 11		56.00 56.00	0.00	85.67 85.67	430.67 430.67	10.38 10.38	24.22	0.00	0.00	0.00 na 0.00 na
7/31/2000 97	0	26	4	86.67	0.00	0	25 25	0			0.00	0	25	0		00.00	0.00	0	14	11		56.00	0.00	85.67	430.67	10.38	24.22	0.00	0.00	0.00 na
8/1/2000 98	0	26	4	86.67	0.00	0	25	0			0.00	0	25	0		00.00	0.00	0	14	11		56.00	0.00	85.67	430.67	10.38	24.22	0.00	0.00	0.00 na
8/3/2000 100 8/4/2000 101	0	26 26	4	86.67 86.67	0.00	0	25 25	0			0.00	0	25 25	0		00.00	0.00	0	14 14	11 11		56.00 56.00	0.00	85.67 85.67	430.67 430.67	10.38 10.38	24.22 24.22	0.00	0.00	0.00 na 0.00 na
8/7/2000 104	0	26	4	86.67	0.00	Ö	25	ō			0.00	0	25	Ō	1	00.00	0.00	1	15	10		60.00	0.00	86.67	355.56	9.43	21.76	0.00	0.00	0.00 na
8/8/2000 105 8/9/2000 106	0	26 26	4	86.67 86.67	0.00	0	25 25	0			0.00	0	25 25	0		00.00	0.00	0	15 15	10 10		60.00 60.00	0.00	86.67 86.67	355.56 355.56	9.43 9.43	21.76 21.76	0.00	0.00	0.00 na 0.00 na
8/10/2000 107	0	26	4	86.67	0.00	Ö	25	ō	1	00.00	0.00	0	25	0	1	00.00	0.00	0	15	10		60.00	0.00	86.67	355.56	9.43	21.76	0.00	0.00	0.00 na
8/11/2000 108 8/14/2000 111	0	26	4	86.67 86.67	0.00	0	25 25	0			0.00	0	25 25	0		00.00	0.00	0	15	10 10		60.00	0.00	86.67	355.56 355.56	9.43 9.43	21.76	0.00	0.00	0.00 na 0.00 na
8/15/2000 111	0	26 26	4	86.67	0.00	0	25 25	0			0.00	0	25 25	0		00.00	0.00	0	15 15	10		60.00	0.00	86.67 86.67	355.56	9.43	21.76 21.76	0.00	0.00	0.00 na
8/16/2000 113	0	26	4	86.67	0.00	0	25	0	1	00.00	0.00	0	25	0	1	00.00	0.00	0	15	10		60.00	0.00	86.67	355.56	9.43	21.76	0.00	0.00	0.00 na

			EN	/ 101-1					EN	M01-2					EM	01-3					EN	101-4				CUMULA	TIVE			CUMULAT	IVE	
	NO.	CUMUL.	CUMUL.	CUMUL.	%	%	NO.	CUMUL.	CUMUL.	CUMUL.	%	%	NO.	CUMUL.	CUMUL.	CUMUL.	%	%	NO.	CUMUL.	CUMUL.	CUMUL.	%	%	MOR	TALITY ST	TATIST	ICS	META	MORPH ST	TATISTIC	cs
DATE DAY	DEAD	DEAD	LIVE	METAM.	DEAD	METAM.	DEAD	DEAD	LIVE	METAM.	DEAD	METAM.	DEAD	DEAD	LIVE	METAM.	DEAD	METAM.	DEAD	DEAD	LIVE	METAM.	DEAD	METAM.	MEAN %	VAR (S2)	SEM	CV (%)	MEAN %	VAR (S2)	SEM C	CV (%)
8/17/2000 114	0	26	4		86.67	0.00	0	25	0		100.00	0.00	0	25	0		100.00	0.00	0	15	10		60.00	0.00	86.67	355.56	9.43	21.76	0.00	0.00	0.00	na
8/18/2000 115	0	26	4		86.67	0.00	0	25	0		100.00	0.00	0	25	0		100.00	0.00	0	15	10		60.00	0.00	86.67	355.56	9.43	21.76	0.00	0.00	0.00	na
8/21/2000 118	0	26	4		86.67	0.00	0	25	0		100.00	0.00	0	25	0		100.00	0.00	0	15	10		60.00	0.00	86.67	355.56	9.43	21.76	0.00	0.00	0.00	na
8/22/2000 119	0	26	4		86.67	0.00	0	25	0		100.00	0.00	0	25	0		100.00	0.00	1	16	9		64.00	0.00	87.67	288.44	8.49	19.37	0.00	0.00	0.00	na
8/23/2000 120	0	26	4		86.67	0.00	0	25	0		100.00	0.00	0	25	0		100.00	0.00	2	18	7		72.00	0.00	89.67	178.22	6.67	14.89	0.00	0.00	0.00	na
8/24/2000 121	0	26	4		86.67	0.00	0	25	0		100.00	0.00	0	25	0		100.00	0.00	0	18	7		72.00	0.00	89.67	178.22	6.67	14.89	0.00	0.00	0.00	na
8/25/2000 122	0	26	4		86.67	0.00	0	25	0		100.00	0.00	0	25	0		100.00	0.00	0	18	7		72.00	0.00	89.67	178.22	6.67	14.89	0.00	0.00	0.00	na
8/28/2000 125	0	26	4		86.67	0.00	0	25	0		100.00	0.00	0	25	0		100.00	0.00	0	18	7		72.00	0.00	89.67	178.22	6.67	14.89	0.00	0.00	0.00	na
8/29/2000 126	0	26	4		86.67	0.00	0	25	0		100.00	0.00	0	25	0		100.00	0.00	0	18	7		72.00	0.00	89.67	178.22	6.67	14.89	0.00	0.00	0.00	na
8/30/2000 127	0	26	4		86.67	0.00	0	25	0		100.00	0.00	0	25	0		100.00	0.00	0	18	7		72.00	0.00	89.67	178.22	6.67	14.89	0.00	0.00	0.00	na
8/31/2000 128	0	26	4		86.67	0.00	0	25	0		100.00	0.00	0	25	0		100.00	0.00	0	18	7		72.00	0.00	89.67	178.22	6.67	14.89	0.00	0.00	0.00	na
9/1/2000 129	0	26	4		86.67	0.00	0	25	0		100.00	0.00	0	25	0		100.00	0.00	0	18	7		72.00	0.00	89.67	178.22	6.67	14.89	0.00	0.00	0.00	na
9/5/2000 133	0	26	4		86.67	0.00	0	25	0		100.00	0.00	0	25	0		100.00	0.00	1	19	6		76.00	0.00	90.67	135.11	5.81	12.82	0.00	0.00	0.00	na
9/6/2000 134	0	26	4		86.67	0.00	0	25	0		100.00	0.00	0	25	0		100.00	0.00	0	19	6		76.00	0.00	90.67	135.11	5.81	12.82	0.00	0.00	0.00	na
9/7/2000 135	0	26	4		86.67	0.00	0	25	0		100.00	0.00	0	25	0		100.00	0.00	0	19	6		76.00	0.00	90.67	135.11	5.81	12.82	0.00	0.00	0.00	na
9/8/2000 136	0	26	4		86.67	0.00	0	25	0		100.00	0.00	0	25	0		100.00	0.00	1	20	5		80.00	0.00	91.67	100.00	5.00	10.91	0.00	0.00	0.00	na
9/11/2000 139	0	26	4		86.67	0.00	0	25	0		100.00	0.00	0	25	0		100.00	0.00	0	20	5		80.00	0.00	91.67	100.00	5.00	10.91	0.00	0.00	0.00	na
9/12/2000 140	0	26	4		86.67	0.00	0	25	0		100.00	0.00	0	25	0		100.00	0.00	0	20	5		80.00	0.00	91.67	100.00	5.00	10.91	0.00	0.00	0.00	na
9/13/2000 141	0	26	4		86.67	0.00	0	25	0		100.00	0.00	0	25	0		100.00	0.00	0	20	5		80.00	0.00	91.67	100.00	5.00	10.91	0.00	0.00	0.00	na
9/14/2000 142	0	26	4		86.67	0.00	0	25	0		100.00	0.00	0	25	0		100.00	0.00	0	20	5		80.00	0.00	91.67	100.00	5.00	10.91	0.00	0.00	0.00	na

HOUSATONIC RIVER PROJECT RANA pipiens DEVELOPMENTAL STUDY 2000 MORTALITY/METAMORPH DATA R3 REFERENCE LARVAE IN REFERENCE SITE 40 (MP), 0.04 mg/Kg SEDIMENT PCB

DATE DAY DEAD LIVE METAM. DEAD METAM. DEAD METAM. DEAD DEAD LIVE METAM. DEAD DEAD LIVE METAM. DEAD DEAD LIVE METAM. DEAD METAM		METAMORPH STATISTICS MEAN % VAR (S2) SEM CV (%)
5/24/2000 0 0 0 20 0.00 0.00 0 0 20 0.00 0.0	0.00 0.00 0.00 na	MEAN % VAR (S2) SEW CV (%)
		0.00 0.00 0.00 na
5/25/2000 1 0 0 20 0.00 0.00 1 1 1 19 5.00 0.00 3 3 17 15.00 0.00 1 1 1 19 5.00 0.00 6.25 5/26/2000 2 0 0 20 0.00 0.00 0 1 1 19 5.00 0.00 0 3 17 15.00 0.00 1 2 18 10.00 0.00 7.00 1		0.00 0.00 0.00 na 0.00 0.00 0.00 na
5/30/2000 6 0 0 20 0.00 0.00 0 1 19 5.00 0.00 0 3 17 15.00 0.00 0 2 18 10.00 0.00 7.50		0.00 0.00 0.00 na
5/3/2000 7 0 0 20 0.00 0.00 1 2 18 10.00 0.00 0 3 17 15.00 0.00 1 3 17 15.00 0.00 10.00		0.00 0.00 0.00 na
61/12000 8 0 0 20 0.00 0.00 0 2 18 10.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 10		0.00 0.00 0.00 na 0.00 0.00 0.00 na
6/5/2000 12 0 0 20 0.00 0.00 0 2 18 10.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 10.00	0.00 50.00 3.54 70.71	0.00 0.00 0.00 na
66/2000 13 0 0 20 0.00 0.00 1 3 17 15.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 11.25 66/2000 15 0 0 20 0.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 10 3 17 15.00		0.00 0.00 0.00 na 0.00 0.00 0.00 na
69/2000 16 0 0 20 0.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 1 1.25		0.00 0.00 0.00 na
6/12/2000 19 0 0 20 0.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 11.25		0.00 0.00 0.00 na
6/13/2000 20 0 0 20 0.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 11.25 16/14/2000 21 0 0 20 0.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 11.25		0.00 0.00 0.00 na 0.00 0.00 0.00 na
6/15/2000 22 0 0 20 0.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 11.25	1.25 56.25 3.75 66.67	0.00 0.00 0.00 na
6/16/2000 23 0 0 20 0.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 11.25 15.00 0.00 11.25 15.00 0.00 12.25 15.00 0.00 0.00 12.25 15.00 0.00 0.00 12.25 15.00 0.		0.00 0.00 0.00 na
6/19/2000 26 0 0 20 0.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 11.25 6/20/2000 27 0 0 20 0.00 0.00 1 4 16 20.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 10 3		0.00 0.00 0.00 na 0.00 0.00 0.00 na
6/21/2000 28 0 0 20 0.00 0.00 0 4 16 20.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 12.50	2.50 75.00 4.33 69.28	0.00 0.00 0.00 na
6/22/2000 29 0 0 20 0.00 0.00 0 4 16 20.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 12.50 6/23/2000 30 0 0 20 0.00 0.00 0 4 16 20.00 0.00 0 3 17 15.00 0.00 12.50		0.00 0.00 0.00 na 0.00 0.00 0.00 na
0/22/2000 33 0 0 20 0.00 0.00 0 4 16 2000 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 12.50 0.20 0.00 0.00 12.50		0.00 0.00 0.00 na
6/27/2000 34 0 0 20 0.00 0.00 0 4 16 20.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 12.50	2.50 75.00 4.33 69.28	0.00 0.00 0.00 na
6/28/2000 35 0 0 20 0.00 0.00 0 4 16 20.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 12.50 6/28/2000 36 0 0 20 0.00 0.00 0 4 16 20.00 0.00 0 3 17 15.00 0.00 12.50		0.00 0.00 0.00 na 0.00 0.00 0.00 na
6/30/2000 37 0 0 20 0.00 0.00 0 4 16 20.00 0.00 0 3 17 15.00 0.00 0 3 17 15.00 0.00 12.50		0.00 0.00 0.00 na
7/5/2000 42 0 0 20 0.00 0.00 0 4 16 20.00 0.00 0 3 17 15.00 0.00 1 4 16 20.00 0.00 13.75		0.00 0.00 0.00 na
$\frac{7662000}{7102000} \begin{array}{cccccccccccccccccccccccccccccccccccc$		0.00 0.00 0.00 na 0.00 0.00 0.00 na
7/11/2000 48 0 0 20 0.00 0.00 0 4 16 20.00 0.00 0 3 17 15.00 0.00 0 4 16 20.00 0.00 13.75	3.75 89.58 4.73 68.84	0.00 0.00 0.00 na
7/12/2000 49 0 0 20 0.00 0.00 0 4 16 20.00 0.00 0 3 17 15.00 0.00 0 4 16 20.00 0.00 13.75		0.00 0.00 0.00 na
7/13/22000 50 0 0 20 0.00 0.00 0 4 16 220,00 0.00 0 3 17 15,00 0.00 0 4 16 220,00 0.00 13,75 7/17/22000 54 0 0 20 0.00 0.00 0 4 16 220,00 0.00 13,75 7/17/22000 54 0 0 20 0.00 0.00 13,75 7/17/22000 54 0 0 20 0.00 0.00 13,75 7/17/22000 54 0 0 0 20 0.00 0.00 13,75 7/17/22000 54 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		0.00 0.00 0.00 na 0.00 0.00 0.00 na
7/18/2000 55 5 5 15 25.00 0.00 0 4 16 20.00 0.00 0 3 17 15.00 0.00 0 4 16 20.00 0.00 20.00	20.00 16.67 2.04 20.41	0.00 0.00 0.00 na
7/19/2000 56 0 5 15 25.00 0.00 0 4 16 20.00 0.00 0 3 17 15.00 0.00 0 4 16 20.00 0.00 20.00 17/20/2000 57 1 6 14 30.00 0.00 0 4 16 20.00 0.00 2.00 20.00 17/20/2000 57 1 6 14 30.00 0.00 0 4 16 20.00 0.00 21.25		0.00 0.00 0.00 na 0.00 0.00 0.00 na
7/21/2000 58 0 6 144 30.00 0.00 0 4 16 20.00 0.00 1 4 16 20.00 0.00 0 0 4 16 20.00 0.00 22.55		0.00 0.00 0.00 na
7/24/2000 61 0 6 14 30.00 0.00 0 4 16 20.00 0.00 0 4 16 20.00 0.00 0 4 16 20.00 0.00 0 4 16 20.00 0.00 22.50	22.50 25.00 2.50 22.22	0.00 0.00 0.00 na
7/25/2000 62 0 6 14 30.00 0.00 0 4 16 20.00 0.00 0 4 16 20.00 0.00 22.50 7/25/2000 63 0 6 14 30.00 0.00 0 0 4 16 20.00 0.00 0 4 16 20.00 0.00 12.50		0.00 0.00 0.00 na 0.00 0.00 0.00 na
7/27/2000 64 0 6 14 30.00 0.00 0 4 16 20.00 0.00 0 4 16 20.00 0.00 0 0 4 16 20.00 0.00 0 22.50		0.00 0.00 0.00 na
7/28/2000 65 0 6 14 30.00 0.00 0 4 16 20.00 0.00 0 4 16 20.00 0.00 0 4 16 20.00 0.00 22.50		0.00 0.00 0.00 na
73172000 68 0 6 14 30.00 0.00 0 4 16 20.00 0.00 0 4 16 20.00 0.00 0 4 16 20.00 0.00 22.50 81/2000 69 0 6 14 30.00 0.00 0 0 4 16 20.00 0.00 0 4 16 20.00 0.00 12.50		0.00 0.00 0.00 na 0.00 0.00 0.00 na
8/3/2000 71 1 7 13 35.00 0.00 0 4 16 20.00 0.00 0 4 16 20.00 0.00 0 4 16 20.00 0.00 23.75	23.75 56.25 3.75 31.58	0.00 0.00 0.00 na
87/2000 75 0 7 13 35.00 0.00 0 4 16 20.00 0.00 0 4 16 20.00 0.00 0 4 16 20.00 0.00 23.75 8/8/2000 76 0 7 13 35.00 0.00 1 5 15 25.00 0.00 1 5 15 25.00 0.00 0 4 16 20.00 0.00 20.75		0.00 0.00 0.00 na 0.00 0.00 0.00 na
68/9/2000 77 0 7 13 35.00 0.00 0 5 15 25.00 0.00 1 5 15 25.00 0.00 0 4 16 20.00 0.00 26.25		0.00 0.00 0.00 na
8/10/2000 78 0 7 13 35.00 0.00 0 5 15 25.00 0.00 0 5 15 25.00 0.00 0 4 16 20.00 0.00 26.25	26.25 39.58 3.15 23.97	0.00 0.00 0.00 na
8/11/2000 79 0 7 13 35.00 0.00 0 5 15 25.00 0.00 0 5 15 25.00 0.00 0 4 16 20.00 0.00 26.25 11/2000 82 0 7 13 35.00 0.00 0 5 15 25.00 0.00 0 5 15 25.00 0.00 0 4 16 20.00 0.00 26.25 25.00 0.00 0 5 15 25.00 0.00 0 4 16 20.00 0.00 26.25 25.00 0.00 0 5 15 25.00 0.00 0 4 16 20.00 0.00 26.25 25.00 0.00 0 5 15 25.00 0.00 0 5		0.00 0.00 0.00 na 0.00 0.00 0.00 na
815/2000 83 0 7 13 35.00 0.00 0 5 15 25.00 0.00 0 5 15 25.00 0.00 1 5 15 25.00 0.00 2 7.50		0.00 0.00 0.00 na
8/16/2000 84 0 7 13 35.00 0.00 0 5 15 1 25.00 5.00 0 5 15 1 25.00 5.00 0 5 15 25.00 0.00 27.50		2.50 8.33 1.44 115.47
8/17/2000 85 0 7 13 35.00 0.00 0 5 15 1 25.00 5.00 0 5 15 1 25.00 5.00 0 5 15 25.00 0.00 27.50 18/18/2000 86 0 7 13 35.00 0.00 0 5 15 1 25.00 5.00 0 5 15 25.00 0.00 27.50		2.50 8.33 1.44 115.47 2.50 8.33 1.44 115.47
8/21/2000 89 0 7 13 35.00 0.00 0 5 15 1 25.00 5.00 0 5 15 1 25.00 5.00 0 5 15 25.00 0.00 27.50	27.50 25.00 2.50 18.18	2.50 8.33 1.44 115.47
8/22/2000 90 0 7 13 35.00 0.00 0 5 15 1 25.00 5.00 0 5 15 1 25.00 5.00 0 5 15 25.00 0.00 27.55.00 0 1 0 7 13 35.00 0.00 0 5 15 1 25.00 5.00 0 5 15 25.00 0.00 27.55.00 0.00 27.55.00 0.00 27.55.00 0.00 27.55.00 0.00 27.55.00 0.00 27.55.00 0.00 27.55.00 0.00 0.00 0.00 0.00 0.00 0.00 0.		2.50 8.33 1.44 115.47
8/23/2000 91 0 7 13 35.00 0.00 0 5 15 1 25.00 5.00 0 5 15 1 25.00 5.00 0 5 15 25.00 0.00 27.50 15 1 25.00 5.00 0 5 15 25.00 0.00 27.50 15 25.00 15 25.		2.50 8.33 1.44 115.47 2.50 8.33 1.44 115.47
8/25/2000 93 0 7 13 35.00 0.00 0 5 15 1 25.00 5.00 0 5 15 1 25.00 5.00 0 5 15 25.00 0.00 27.50	27.50 25.00 2.50 18.18	2.50 8.33 1.44 115.47
8/28/2000 96 1 8 12 40.00 0.00 0 5 15 2 25.00 10.00 0 5 15 1 25.00 50.0 0 5 15 25.00 0.00 28/50 9/10/2000 19 4 12 8 60.00 0.00 0 5 15 2 25.00 10.00 7 12 8 1 60.00 5.00 2 7 13 35.00 0.00 48/50		3.75 22.92 2.39 127.66 3.75 22.92 2.39 127.66
9/10/2000 109 4 12 8 60.00 0.00 0 5 15 2 25.00 10.00 7 12 8 1 60.00 5.00 2 7 13 35.00 0.00 45.00 10 10 0 12 8 60.00 0.00 0 5 15 2 25.00 10.00 0 12 8 1 60.00 5.00 0 7 13 35.00 0.00 45.00		3.75 22.92 2.39 127.66 3.75 22.92 2.39 127.66
9/12/2000 111 0 12 8 60.00 0.00 0 5 15 2 25.00 10.00 0 12 8 1 60.00 5.00 0 7 13 35.00 0.00 45.00	5.00 316.67 8.90 39.54	3.75 22.92 2.39 127.66
9/13/2000 112 0 12 8 60.00 0.00 0 5 15 2 25.00 10.00 0 12 8 1 60.00 5.00 0 7 13 35.00 0.00 45.00 0 14 13 0 12 8 60.00 0.00 0 0 5 15 2 25.00 10.00 0 12 8 1 60.00 5.00 0 7 13 35.00 0.00 45.00 0 14 15 15 15 15 15 15 15 15 15 15 15 15 15		3.75 22.92 2.39 127.66 3.75 22.92 2.39 127.66
	0.00 00.01	2 2 2.00 121.00

HOUSATONIC RIVER PROJECT RANA pipiens DEVELOPMENTAL STUDY 2000 MORTALITY/METAMORPH DATA R3 REFERENCE LARVAE IN REFERENCE SITE 40 (MP), 0.04 mg/Kg SEDIMENT PCB

DATE DAY DEAD LIVE METAM. DEAD METAM. DEAD METAM. DEAD METAM. DEAD METAM. DEAD DEAD LIVE METAM. DEAD METAM. DEAD DEAD LIVE METAM. DEAD MET	METAMORPH STATISTICS
5/24/2000 0 0 0 20 0.00 0.00 0 0 20 0.00 0.0	a 0.00 0.00 0.00 na
	.00 0.00 0.00 0.00 na
	.71 0.00 0.00 0.00 na
	.64 0.00 0.00 0.00 na
	.64 0.00 0.00 0.00 na .64 0.00 0.00 0.00 na
6/5/2000 12 0 4 16 20.00 0.00 0 2 18 10.00 0.00 0 3 17 15.00 0.00 0 1 19 5.00 0.00 12.50 41.67 3.23	.64 0.00 0.00 0.00 na
	.10 0.00 0.00 0.00 na .10 0.00 0.00 0.00 na
	.10 0.00 0.00 0.00 na
	.10 0.00 0.00 0.00 na
	.10 0.00 0.00 0.00 na .10 0.00 0.00 0.00 na
	10 0.00 0.00 0.00 na
	.10 0.00 0.00 0.00 na
	.10 0.00 0.00 0.00 na .10 0.00 0.00 0.00 na
6/21/2000 28 0 5 15 25.00 0.00 0 2 18 10.00 0.00 0 3 17 15.00 0.00 0 1 19 5.00 0.00 13.75 72.92 4.27	.10 0.00 0.00 0.00 na
	.10 0.00 0.00 0.00 na
	.10 0.00 0.00 0.00 na .10 0.00 0.00 0.00 na
6/27/2000 34 0 5 15 25.00 0.00 0 2 18 10.00 0.00 0 3 17 15.00 0.00 1 2 18 10.00 0.00 15.00 50.00 3.54	.14 0.00 0.00 0.00 na
	.14 0.00 0.00 0.00 na .14 0.00 0.00 0.00 na
	14 0.00 0.00 0.00 na
	.14 0.00 0.00 0.00 na
	.14 0.00 0.00 0.00 na .14 0.00 0.00 0.00 na
7/11/2000 48 0 5 15 25.00 0.00 0 2 18 10.00 0.00 0 3 17 15.00 0.00 0 2 18 10.00 0.00 3.54	.14 0.00 0.00 0.00 na
	.14 0.00 0.00 0.00 na
	.14 0.00 0.00 0.00 na .14 0.00 0.00 0.00 na
7/18/2000 55 0 5 15 25.00 0.00 0 2 18 10.00 0.00 1 4 16 20.00 0.00 0 2 18 10.00 0.00 16.25 56.25 3.75	.15 0.00 0.00 0.00 na
	.15 0.00 0.00 0.00 na .15 0.00 0.00 0.00 na
	.15 0.00 0.00 0.00 na
7/24/2000 61 0 5 15 25.00 0.00 0 2 18 10.00 0.00 0 4 16 20.00 0.00 0 2 18 10.00 0.00 16.25 56.25 3.75	.15 0.00 0.00 0.00 na
	.15 0.00 0.00 0.00 na .15 0.00 0.00 0.00 na
	15 0.00 0.00 0.00 na
	.15 0.00 0.00 0.00 na
	.15 0.00 0.00 0.00 na .15 0.00 0.00 0.00 na
	.15 0.00 0.00 0.00 na
	.15 0.00 0.00 0.00 na .89 0.00 0.00 0.00 na
8/9/2000 77 0 5 15 25.00 0.00 0 2 18 10.00 0.00 0 4 16 20.00 0.00 0 3 17 15.00 0.00 17.50 41.67 3.23	.89 0.00 0.00 0.00 na
8/10/2000 78 0 5 15 25.00 0.00 0 2 18 10.00 0.00 0 4 16 20.00 0.00 0 3 17 15.00 0.00 17.50 41.67 3.23	.89 0.00 0.00 0.00 na
	.89 0.00 0.00 0.00 na .89 0.00 0.00 0.00 na
	.89 0.00 0.00 0.00 na
	.89 2.50 25.00 2.50 200.00
	.89 2.50 25.00 2.50 200.00 .89 2.50 25.00 2.50 200.00
	00 2.50 25.00 2.50 200.00
	00 2.50 25.00 2.50 200.00
	.64 5.00 33.33 2.89 115.47 .64 5.00 33.33 2.89 115.47
8/25/2000 93 0 6 14 30.00 0.00 0 2 18 2 10.00 10.00 0 5 15 2 25.00 10.00 0 3 17 15.00 0.00 20.00 83.33 4.56	.64 5.00 33.33 2.89 115.47
	17 7.50 41.67 3.23 86.07
	.18 7.50 41.67 3.23 86.07 .18 7.50 41.67 3.23 86.07
9/12/2000 111 0 12 8 60.00 0.00 0 8 12 3 40.00 15.00 0 10 10 2 50.00 10.00 0 4 16 1 20.00 5.00 42.50 291.67 8.54	.18 7.50 41.67 3.23 86.07
	.18 7.50 41.67 3.23 86.07 .18 7.50 41.67 3.23 86.07
3.1.250 1.0 0 1.2 0 0.00 0.00 0 1.2 0 1.00 0 10 10 2 0.00 10.00 0 4 10 1 20.00 0.00 42.00 201.01 0.00	7.55 7.57 5.25 66.67

HOUSATONIC RIVER PROJECT RANA pipiens DEVELOPMENTAL STUDY 2000 MORTALITY/METAMORPH DATA R3 REFERENCE LARVAE IN REFERENCE SITE 40 (MP), 0.04 mg/Kg SEDIMENT PCB

COMBINED EGG MASS STATISTICS

													CO	MBINEL	EGG M	IASS STA	ATISTIC	38							i			1			
	l NO	CHMIII	CUMUI	CUMUL.	0/	%	NO. CU	IMI II	CLIMILII	CHMIII	%	%	NO.	CLIMITI	CHMUI	. CUMUL.	9/	%	l NO	CUMUL.	CLIMILII	CLIMILII	9/	%	MO	MEA RTALITY S		ce	META	MEAN	I STATISTICS
DATE DAY		DEAD.			DEAD ME																										SEM CV (%)
DAIL DAI	DEAD	DEAD	LIVL	IVIL I / IVII.	DEAD INIE	. I / NWI.	DEAD DE	LAD	LIVL	WILL I AWI.	DLAD	MILIAM.	DEAD	DLAD	LIVE	IVIL I AIVI.	DLAD	WILLIAM.	DEAD	DLAD	LIVE	IVIL I AIVI.	DLAD	WIL I AW.	IVILAIN 70	VAIX (02)	OLIVI	OV (70)	IVILAIN 70	VAIT (02)	OLIVI CV (70)
5/24/2000 0																									0.00	0.00	0.00	na	0.00	0.00	0.00 na
5/25/2000 1																									4.38	7.03	1.88	60.61	0.00	0.00	0.00 na
5/26/2000 2																									6.88	0.78	0.63	12.86	0.00	0.00	0.00 na
5/30/2000 6																									8.13	0.78	0.63	10.88	0.00	0.00	0.00 na
5/31/2000 7																									11.25	3.13	1.25	15.71	0.00	0.00	0.00 na
6/1/2000 8																									11.25	3.13	1.25	15.71	0.00	0.00	0.00 na
6/2/2000 9 6/5/2000 12																									11.25 11.25	3.13	1.25 1.25	15.71 15.71	0.00	0.00	0.00 na 0.00 na
6/6/2000 13																									12.50	3.13 3.13	1.25	14.14	0.00	0.00	0.00 na 0.00 na
6/8/2000 15																									12.50	3.13	1.25	14.14	0.00	0.00	0.00 na
6/9/2000 16																									12.50	3.13	1.25	14.14	0.00	0.00	0.00 na
6/12/2000 19																									12.50	3.13	1.25	14.14	0.00	0.00	0.00 na
6/13/2000 20																									12.50	3.13	1.25	14.14	0.00	0.00	0.00 na
6/14/2000 21																									12.50	3.13	1.25	14.14	0.00	0.00	0.00 na
6/15/2000 22 6/16/2000 23																									12.50	3.13	1.25 1.25	14.14 14.14	0.00	0.00	0.00 na
6/16/2000 23 6/19/2000 26																									12.50 12.50	3.13 3.13	1.25	14.14	0.00	0.00	0.00 na 0.00 na
6/20/2000 27																									13.13	0.78	0.63	6.73	0.00	0.00	0.00 na
6/21/2000 28																									13.13	0.78	0.63	6.73	0.00	0.00	0.00 na
6/22/2000 29																									13.13	0.78	0.63	6.73	0.00	0.00	0.00 na
6/23/2000 30																									13.13	0.78	0.63	6.73	0.00	0.00	0.00 na
6/26/2000 33																									13.13	0.78	0.63	6.73	0.00	0.00	0.00 na
6/27/2000 34																									13.75	3.13	1.25	12.86	0.00	0.00	0.00 na
6/28/2000 35 6/29/2000 36																									13.75 13.75	3.13 3.13	1.25 1.25	12.86 12.86	0.00	0.00	0.00 na 0.00 na
6/30/2000 37																									13.75	3.13	1.25	12.86	0.00	0.00	0.00 na
7/5/2000 42																									14.38	0.78	0.63	6.15	0.00	0.00	0.00 na
7/6/2000 43																									14.38	0.78	0.63	6.15	0.00	0.00	0.00 na
7/10/2000 47																									14.38	0.78	0.63	6.15	0.00	0.00	0.00 na
7/11/2000 48																									14.38	0.78	0.63	6.15	0.00	0.00	0.00 na
7/12/2000 49																									14.38	0.78	0.63	6.15	0.00	0.00	0.00 na
7/13/2000 50 7/17/2000 54																									14.38 14.38	0.78 0.78	0.63	6.15 6.15	0.00	0.00	0.00 na 0.00 na
7/18/2000 55																									18.13	7.03	1.88	14.63	0.00	0.00	0.00 na
7/19/2000 56																									18.13	7.03	1.88	14.63	0.00	0.00	0.00 na
7/20/2000 57																									18.75	12.50	2.50	18.86	0.00	0.00	0.00 na
7/21/2000 58																									19.38	19.53	3.13	22.81	0.00	0.00	0.00 na
7/24/2000 61																									19.38	19.53	3.13	22.81	0.00	0.00	0.00 na
7/25/2000 62																									19.38	19.53	3.13	22.81	0.00	0.00	0.00 na
7/26/2000 63 7/27/2000 64																									19.38 19.38	19.53 19.53	3.13 3.13	22.81 22.81	0.00	0.00	0.00 na 0.00 na
7/28/2000 65																									19.38	19.53	3.13	22.81	0.00	0.00	0.00 na
7/31/2000 68																									19.38	19.53	3.13	22.81	0.00	0.00	0.00 na
8/1/2000 69																									19.38	19.53	3.13	22.81	0.00	0.00	0.00 na
8/3/2000 71																			1						20.00	28.13	3.75	26.52	0.00	0.00	0.00 na
8/7/2000 75																			1						20.00	28.13	3.75	26.52	0.00	0.00	0.00 na
8/8/2000 76																			1						21.88	38.28	4.38	28.28	0.00	0.00	0.00 na
8/9/2000 77 8/10/2000 78																			1						21.88 21.88	38.28 38.28	4.38 4.38	28.28 28.28	0.00	0.00	0.00 na 0.00 na
8/11/2000 78																			1						21.88	38.28	4.38	28.28	0.00	0.00	0.00 na
8/14/2000 79																			1						21.88	38.28	4.38	28.28	0.00	0.00	0.00 na
8/15/2000 83																									22.50	50.00	5.00	31.43	0.00	0.00	0.00 na
8/16/2000 84																			1						22.50	50.00	5.00	31.43	2.50	0.00	0.00 0.00
8/17/2000 85																			1						22.50	50.00	5.00	31.43	2.50	0.00	0.00 0.00
8/18/2000 86																									22.50	50.00	5.00	31.43	2.50	0.00	0.00 0.00
8/21/2000 89 8/22/2000 90																			1						23.13 23.13	38.28 38.28	4.38 4.38	26.76 26.76	2.50 2.50	0.00	0.00 0.00 0.00 0.00
8/22/2000 90 8/23/2000 91																			1						23.13	38.28 28.13	3.75	26.76	3.75	3.13	1.25 47.14
8/24/2000 92																			1						23.75	28.13	3.75	22.33	3.75	3.13	1.25 47.14
8/25/2000 93																									23.75	28.13	3.75	22.33	3.75	3.13	1.25 47.14
8/28/2000 96																			1						25.00	28.13	3.75	21.21	5.63	7.03	1.88 47.14
9/10/2000 109																									43.75	3.13	1.25	4.04	5.63	7.03	1.88 47.14
9/11/2000 110																			1						43.75	3.13	1.25	4.04	5.63	7.03	1.88 47.14
9/12/2000 111																									43.75	3.13	1.25	4.04	5.63	7.03	1.88 47.14
9/13/2000 112 9/14/2000 113																									43.75 43.75	3.13 3.13	1.25 1.25	4.04 4.04	5.63 5.63	7.03 7.03	1.88 47.14 1.88 47.14
J/14/2000 113																									43.73	3.13	1.20	4.04	5.03	1.03	1.00 41.14

HOUSATONIC RIVER PROJECT RANA pipiens DEVELOPMENTAL STUDY 2000 METAMORPH DATA R3 REFERENCE LARVAE IN DECHLORINATED (Aged) TAP WATER

FINAL METAMORPH DATA OF ADDITIONAL REFERENCE SPECIMENS CULTURED IN DECHLORINATED TAP WATER

Co	omposited EM01/EM02	2-1	С	omposited EM01/EM0	2-2	C	omposited EM01/EM0	2-3	C	omposited EM01/EM0	2-4		CUMULATIVE METAI	MORPH STATISTICS	S
Total	Number	%	Total	Number	%	Total	Number	%	Total	Number	%				
Number	Metamorphed	Metamorphed	Number	Metamorphed	Metamorphed	Number	Metamorphed	Metamorphed	Number	Metamorphed	Metamorphed	MEAN %	VAR (S2)	SEM	CV (%)
40	20	50.00	40	28	70.00	40	31	77.50	40	21	52.50	62.50	179.17	6.69	21.42

HOUSATONIC RIVER PROJECT RANA pipiens DEVELOPMENTAL STUDY 2000 STAGE/MALFORMATION DATA SUMMARY FOR FIGURES

% MALFORMED BY SITE AND STUDY DAY

Site	W-7a (1	8.0 mg/k	(g Sed PCB)	Reps=4, 1	105 Days*
D	AY S	STAGE	% MAL.	SEM	EVENT
	0	20	15.67	4.91	1
	7	20	16.83	3.30	2
	13	20	18.67	3.13	3
1	24	21	15.00	3.00	4
,	31	21	10.33	4.23	5
;	36	22	10.00	3.46	6
4	49	22	6.33	2.33	7
	71	23	6.67	0.94	8
1	05	27	6.67	0.94	9
Gran	nd Mean	s:	11.80	2.41	

0.1 - 147	0 /40 0 //	. 0	\ D	04.0
	6 (42.0 mg/k			
DAY	STAGE	% MAL	SEM	EVENT
0	20	20.43	1.69	1
10	21	23.43	2.88	2
17	21	21.43	2.50	3
22	22	9.57	1.23	4
35	22	9.57	1.23	5
57	23	6.90	1.46	6
91	27	8.35	2.62	7
Grand Me	ans:	14.24	3.58	

Site W-4	(0.46 mg/K	g Sed PCB)	Reps=8, 1	111 Days*
DAY	STAGE	% MAL.	SEM	EVENT
0	20	2.83	0.83	1
6	21	2.42	0.42	2
13	22	1.00	0.50	3
19	23	0.67	0.33	4
30	24	0.00	0.00	5
37	24	0.00	0.00	6
42	24	0.00	0.00	7
55	26	0.00	0.00	8
77	28	0.00	0.00	9
111	37	0.00	0.00	10
Grand Me	eans:	0.69	0.38	

Site EW-	-3 (30.0 mg/	Kg Sed PCE	B) Reps=1	, 22 Days*
DAY	STAGE	% MAL	SEM	EVENT
0	20	30.00	na	1
10	21	50.00	na	2
17	21	40.00	na	3
22	22	30.00	na	4
Grand Me	ans:	37.50	9.57	

Site W-1	(0.15 mg/K	g Sed PCB)	Reps=4,	105 Days*
DAY	STAGE	% MAL.	SEM	EVENT
0	21	1.83	1.07	1
7	22	1.83	1.07	2
24	23	0.00	na	3
31	23	10.22	7.15	4
36	24	1.33	1.33	5
49	25	0.00	na	6
71	27	0.00	na	7
105	40	0.00	na	8
Grand Me	ans:	1.90	1.73	

REFERENCE SITE DATA SHARED WITH CROSSOVER STUDY

R3 in Site	MP (0.04 mg	g/Kg Sed P	CB) Reps=	8, 76 Days'
DAY	STAGE	% MAL	SEM	EVENT
0	20	0.00	0.00	1
7	23	0.00	0.00	2
20	25	0.00	0.00	3
42	29	1.25	0.00	4
48	30	16.88	13.13	5
76	38	2.50	2.50	6
Grand Me	ans:	3.44	2.35	

*test duration.

STAGE 20, 4/25/2000, DAY 0

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				T	PE OF M	ALFORM	ATION (D	ELTS OBS	ERVED)	1		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1 EM01-2 EM01-3 EM01-4	30 25 25 25	30 25 25 25	8 3 1 5	26.67 12.00 4.00 20.00	3 2 1 4	4 2 3		2	1 1 1 3					1		
Total:	105	105	17		10	9	0	2	6	0	0	0	0	1	0	0
Means: Var (S2) SEM CV (%)				15.67 96.44 4.91 62.68	9.50 1.67 0.65 13.59	8.33 1.00 0.58 12.00	0.00 na na na	1.67 na na na	5.83 1.00 0.50 17.14	0.00 na na na	0.00 na na na	0.00 na na na	0.00 na na na	1.00 na na na	0.00 na na na	0.00 na na na

STAGE 20, 5/2/2000, DAY 7

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	ALFORMA	ATION (D	ELTS OBS	ERVED))		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1 EM01-2 EM01-3 EM01-4	30 25 25 25	30 25 25 25	7 4 2 5	23.33 16.00 8.00 20.00	5 3 2 4	3 2 1 3		2 1 3	3 1 2					1		
Total:	105	105	18		14	9	0	6	6	0	0	0	0	1	0	0
Means (based o Var (S2) SEM CV (%)	n initial larval co	ount):		16.83 43.67 3.30 39.26	13.17 1.67 0.65 9.81	8.50 0.92 0.48 11.26	0.00 na na na	5.67 1.00 0.58 17.65	5.50 1.00 0.58 18.18	0.00 na na na	0.00 na na na	0.00 na na na	0.00 na na na	1.00 na na na	0.00 na na na	0.00 na na na

STAGE 20, 5/8/2000, DAY 13

	INITIAL No.	No. of						_								
SAMPLE	LARVAE	LARVAE	NUMBER	%				T	PE OF M	ALFORMA	ATION (D	ELTS OBS	ERVED)	1		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	30	30	8	26.67	5	4			4		2			1		
EM01-2	25	24	4	16.00	1	2			4		2					
EM01-3	25	24	3	12.00	2	3			1							
EM01-4	25	24	5	20.00	4	3			3		2			1		
Total:	105	102	20		12	12	0	0	12	0	6	0	0	2	0	0
Means (based o	n initial larval co	ount):		18.67	11.17	11.33	0.00	0.00	11.33	0.00	5.67	0.00	0.00	1.83	0.00	0.00
Var (S2)		•		39.11	3.33	0.67	na	na	2.00	na	0.00	na	na	0.00	na	na
SEM				3.13	0.91	0.41	na	na	0.71	na	0.00	na	na	0.00	na	na
CV (%)				33.50	16.35	7.20	na	na	12.48	na	0.00	na	na	0.00	na	na

STAGE 21, 5/19/2000, DAY 24

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				T	PE OF M	ALFORMA	ATION (E	ELTS OBS	ERVED))		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1 EM01-2 EM01-3 EM01-4	30 25 25 25	14 7 13 14	6 2 3 5	20.00 8.00 12.00 20.00	3 1 2 3	6 2 3 3	1	2	3 1 2 1		1			1 2		
Total:	105	48	16		9	14	2	2	7	0	1	0	0	3	0	0
Means (based o Var (S2) SEM CV (%)	on initial larval co	ount):		15.00 36.00 3.00 40.00	8.50 0.92 0.48 11.26	13.00 3.00 0.87 13.32	1.83 0.00 0.00 0.00	1.67 na na na	6.50 0.92 0.48 14.73	0.00 na na na	1.00 na na na	0.00 na na na	0.00 na na na	3.00 0.50 0.50 23.57	0.00 na na na	0.00 na na na

STAGE 21, 5/26/2000, DAY 31

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	ALFORM	ATION (D	ELTS OBS	ERVED)	1		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1 EM01-2 EM01-3 EM01-4	30 25 25 25	13 7 4 7	4 2 0 5	13.33 8.00 0.00 20.00	2 1 2	4 2 3			2 1 4		1	1				
Total:	105	31	11		5	9	0	0	7	0	1	3	0	0	0	0
Means (based o Var (S2) SEM CV (%)	n initial larval co	ount):		10.33 71.56 4.23 81.86	4.67 0.33 0.33 12.37	8.33 1.00 0.58 12.00	0.00 na na na	0.00 na na na	6.67 2.33 0.88 22.91	0.00 na na na	1.00 na na na	3.00 0.50 0.50 23.57	0.00 na na na	0.00 na na na	0.00 na na na	0.00 na na na

STAGE 22, 5/31/2000, DAY 36

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	ALFORMA	ATION (E	ELTS OBS	ERVED)		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1 EM01-2 EM01-3 EM01-4	30 25 25 25	13 6 4 3	6 2 2 1	20.00 8.00 8.00 4.00	2 2 2 1	6 1 2 1			4 2 1			1 1		2 2 2 1		
Total:	105	26	11		7	10	0	0	7	0	0	2	0	7	0	0
Means (based o Var (S2) SEM CV (%)	n initial larval co	ount):		10.00 48.00 3.46 69.28	6.67 0.25 0.25 7.50	9.00 5.67 1.19 26.45	0.00 na na na	0.00 na na na	6.33 2.33 0.88 24.12	0.00 na na na	0.00 na na na	1.83 0.00 0.00 0.00	0.00 na na na	6.67 0.25 0.25 7.50	0.00 na na na	0.00 na na na

STAGE 22, 6/13/2000, DAY 49

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	ALFORMA	ATION (D	ELTS OBS	ERVED)	1		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1 EM01-2 EM01-3 EM01-4	30 25 25 25	10 3 4 3	4 1 1 1	13.33 4.00 4.00 4.00	2 1 1	4 1 1			3 1 1		1	2 1 1 1				
Total:	105	20	7		5	7	0	0	5	0	1	5	0	0	0	0
Means (based o Var (S2) SEM CV (%)	n initial larval co	ount):		6.33 21.78 2.33 73.68	4.67 0.25 0.25 10.71	6.33 2.25 0.75 23.68	0.00 na na na	0.00 na na na	4.50 1.33 0.67 25.66	0.00 na na na	0.83 na na na	4.67 0.25 0.25 10.71	0.00 na na na	0.00 na na na	0.00 na na na	0.00 na na na

STAGE 23, 7/5/2000, DAY 71

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	ALFORMA	ATION (D	ELTS OBS	ERVED))		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1 EM01-2 EM01-3 EM01-4	30 25 25 25	6 3 4 3	2 2 2 1	6.67 8.00 8.00 4.00	1 2 1	2 2 1 1			1 2 2		1 1 2 1	2 2 1 1				
Total:	105	16	7		4	6	0	0	5	0	5	6	0	0	0	0
Means (based of Var (S2) SEM CV (%)	on initial larval co	ount):		6.67 3.56 0.94 28.28	3.83 0.33 0.33 15.06	5.67 0.33 0.29 10.19	0.00 na na na	0.00 na na na	4.83 0.33 0.33 11.95	0.00 na na na	4.83 0.25 0.25 10.34	5.67 0.33 0.29 10.19	0.00 na na na	0.00 na na na	0.00 na na na	0.00 na na na

STAGE 25-27, 8/8/2000, DAY 105

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	ALFORMA	ATION (D	ELTS OBS	ERVED))		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1 EM01-2	30 25	6	2	6.67 4.00		1		1	1			1				
EM01-3 EM01-4	25 25 25	4	2	8.00 8.00		2		2 2	2			1 2				
Total:	105	16	7		0	6	0	7	5	0	0	5	0	0	0	0
Means (based o Var (S2) SEM CV (%)	n initial larval co	ount):		6.67 3.56 0.94 28.28	0.00 na na na	5.83 0.33 0.29 9.90	0.00 na na na	6.83 0.25 0.25 7.32	5.00 0.33 0.33 11.55	0.00 na na na	0.00 na na na	4.83 0.25 0.25 10.34	0.00 na na na	0.00 na na na	0.00 na na na	0.00 na na na

GRAND MEANS OF COMBINED LARVAL MALFORMATION DATA

NUMBER	%				TY	PE OF M	ALFORMA	ATION (D	ELTS OBS	ERVED)			
MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
Grand Means:	11.80	6.91	8.48	0.20	1.76	6.28	0.00	1.48	2.22	0.00	1.50	0.00	0.00
SEM	2.41	2.05	1.23	0.31	1.33	1.02	0.00	1.10	1.19	0.00	1.10	0.00	0.00

STAGE 20, 5/29/2000, DAY 0

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF N	ALFORM	ATION (D	ELTS OBS	ERVED)		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
TP01-1 TP01-2 TP01-3 TP01-4	25 25 25 23	25 25 25 23	6 5 4 5	24.00 20.00 16.00 21.74	3 2 2 3	4 3 4 4		2	2 2 3 2		2 1		1 1	1 2 2 2		
Total:	98	98	20		10	15	0	2	9	0	4	0	2	7	0	0
Means: Var (S2) SEM CV (%)				20.43 11.42 1.69 16.54	10.26 0.33 0.29 5.63	15.35 0.25 0.25 3.26	0.00 na na na	2.00 na na na	9.17 0.25 0.25 5.45	0.00 na na na	4.09 0.33 0.33 14.13	0.00 na na na	2.09 0.00 0.00 0.00	7.17 0.25 0.25 6.97	0.00 na na na	0.00 na na na

STAGE 21, 5/19/2000, DAY 10

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	IALFORM	ATION (D	ELTS OBS	ERVED)		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
TP01-1 TP01-2 TP01-3 TP01-4	25 25 25 23	25 25 25 23	8 5 5 5	32.00 20.00 20.00 21.74	3 4 3 3	6 3 4 4		2 2 3	2 2 2		2 1		1	1 2 2 2		
Total:	98	98	23		13	17	0	7	6	0	4	0	1	7	0	0
Means (based o Var (S2) SEM CV (%)	on initial larval co	ount):		23.43 33.28 2.88 24.62	13.26 0.25 0.25 3.77	17.35 1.58 0.63 7.25	0.00 na na na	7.00 0.33 0.33 8.25	6.17 0.00 0.00 0.00	0.00 na na na	4.09 0.33 0.33 14.13	0.00 na na na	1.09 na na na	7.17 0.25 0.25 6.97	0.00 na na na	0.00 na na na

STAGE 21, 5/26/2000, DAY 17

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	ALFORM	ATION (D	ELTS OBS	ERVED))		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
TP01-1	25	20	7	28.00	5	2			4			2				
TP01-2	25	23	4	16.00	4	4			2			1				
TP01-3	25	20	5	20.00	4	4			3			1				
TP01-4	23	22	5	21.74	3	5			2			1		1		
Total:	98	85	21		16	15	0	0	11	0	0	5	0	1	0	0
Means (based o	n initial larval co	ount):		21.43	16.26	15.43	0.00	0.00	11.17	0.00	0.00	5.09	0.00	1.09	0.00	0.00
Var (S2)				24.93	0.67	1.58	na	na	0.92	na	na	0.25	na	na	na	na
SEM				2.50	0.41	0.63	na	na	0.48	na	na	0.25	na	na	na	na
CV (%)				23.29	5.02	8.15	na	na	8.57	na	na	9.83	na	na	na	na

STAGE 22, 5/31/2000, DAY 22

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	YPE OF M	ALFORM	ATION (E	ELTS OBS	ERVED)		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
TP01-1	25	7	2	8.00	2	1			2		2	1				
TP01-2	25	13	3	12.00	3	2			1		3	2				
TP01-3	25	0	na	na												
TP01-4	23	4	2	8.70	2	2			1		2	2			1	
Total:	98	24	7		7	5	0	0	4	0	7	5	0	0	1	0
Means (based o	on initial larval co	ount):		9.57	9.57	6.90	0.00	0.00	5.45	0.00	9.57	6.90	0.00	0.00	1.45	0.00
Var (S2)				4.57	0.33	0.33	na	na	0.33	na	0.33	0.33	na	na	na	na
SEM				1.23	0.33	0.33	na	na	0.33	na	0.33	0.33	na	na	na	na
CV (%)				22.34	6.04	8.37	na	na	10.59	na	6.04	8.37	na	na	na	na

STAGE 22, 6/13/2000, DAY 35

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF N	IALFORM	ATION (E	ELTS OBS	ERVED)		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
TP01-1	25	6	3	12.00	1	3			1			2				
TP01-2 TP01-3	25 25	5 0	2 na	8.00 na	2	2			2			1				
TP01-4	23	4	2	8.70	2	2			2			2				
Total:	98	15	7		5	7	0	0	5	0	0	5	0	0	0	0
Means (based o Var (S2) SEM CV (%)	n initial larval co	ount):		9.57 4.57 1.23 22.34	6.90 0.33 0.33 8.37	9.57 0.33 0.33 6.04	0.00 na na na	0.00 na na na	6.90 0.33 0.33 8.37	0.00 na na na	0.00 na na na	6.90 0.33 0.33 8.37	0.00 na na na	0.00 na na na	0.00 na na na	0.00 na na na

STAGE 23, 7/5/2000, DAY 57

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	IALFORM	ATION (E	ELTS OBS	ERVED)		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
TP01-1	25	6	1	4.00	1	1			1			1				
TP01-2	25	5	2	8.00	2	1			2			1				
TP01-3	25	0	na	na												
TP01-4	23	4	2	8.70	2	1			2	1		1				
Total:	98	15	5		5	3	0	0	5	1	0	3	0	0	0	0
Means (based o	n initial larval co	ount):		6.90	6.90	4.12	0.00	0.00	6.90	1.45	0.00	4.12	0.00	0.00	0.00	0.00
Var (S2)				6.42	0.33	0.00	na	na	0.33	na	na	0.00	na	na	na	na
SEM				1.46	0.33	0.00	na	na	0.33	na	na	0.00	na	na	na	na
CV (%)				36.74	8.37	0.00	na	na	8.37	na	na	0.00	na	na	na	na

STAGE 25-27, 8/8/2000, DAY 91

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				T	PE OF M	ALFORM	ATION (E	ELTS OBS	ERVED)		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
TP01-1	25	2	1	4.00		1			1							
TP01-2	25	5	2	8.00		2			2			1		1		
TP01-3	25	0	na	na												
TP01-4	23	4	3	13.04		3	1		3			2		3		
Total:	98	11	6		0	6	1	0	6	0	0	3	0	4	0	0
Means (based o	n initial larval co	ount):		8.35	0.00	8.35	1.45	0.00	8.35	0.00	0.00	4.23	0.00	5.68	0.00	0.00
Var (S2)				20.54	na	1.00	na	na	1.00	na	na	0.50	na	2.00	na	na
SEM				2.62	na	0.58	na	na	0.58	na	na	0.50	na	1.00	na	na
CV (%)				54.29	na	11.98	na	na	11.98	na	na	16.71	na	24.89	na	na

GRAND MEANS OF COMBINED LARVAL MALFORMATION DATA

NUMBER	%				T	PE OF M	IALFORM	ATION (E	ELTS OBS	ERVED)			
MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
Grand Means:	14.24	9.02	11.01	0.21	1.29	7.73	0.21	2.53	3.89	0.45	3.02	0.21	0.00
SFM	3 58	2 60	2 52	0.27	1 31	0.99	0.27	1 83	1 44	0.41	1 74	0.27	0.00

STAGE 20, 4/19/2000, DAY 0

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	ALFORMA	ATION (D	ELTS OBS	ERVED)			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	30	30	2	6.67	2				2				2			
EM01-2	25	25	0	0.00												
EM01-3	25	25	0	0.00												
EM01-4	25	25	2	8.00	1	1										
Total:	105	105	4		3	1	0	0	2	0	0	0	2	0	0	0
Means:				3.67	2.67	1.00	0.00	0.00	1.67	0.00	0.00	0.00	1.67	0.00	0.00	0.00
EM02-1	30	30	0	0.00												
EM02-2	25	25	1	4.00		1										
EM02-3	25	25	0	0.00												
EM02-4	25	25	1	4.00		1										
Total:	105	105	2		0	2	0	0	0	0	0	0	0	0	0	0
Means:				2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grand Means: Var (S2) SEM CV (%)				2.83 1.39 0.83 41.59	1.33 3.56 1.33 141.42	1.50 0.50 0.50 47.14	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.83 1.39 0.83 141.42	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.83 1.39 0.83 141.42	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na

STAGE 21, 4/25/2000, DAY 6

	INITIAL No.	No. of		٠,				_	/n= a=							
SAMPLE ID	LARVAE at DAY 0	LARVAE LIVING	NUMBER MALFORMED	% MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARRIAC	STUNTED
	al DAT U	LIVING	WALFURWED	WAL.	EDEIVIA	IAIL	NOTOCHORD	FIIN	FACE	DRAIN	EIE	WUUUTH	GUI	NEWURKNAGE	CARDIAC	STUNTED
EM01-1	30	29	1	3.33	1				1					1		
EM01-2	25	23	1	4.00	1											
EM01-3	25	24	1	4.00	1	1										
EM01-4	25	25	0	0.00												
Total:	105	101	3		3	1	0	0	1	0	0	0	0	1	0	0
Means (based or	n initial larval co	ount):		2.83	2.83	1.00	0.00	0.00	0.83	0.00	0.00	0.00	0.00	0.83	0.00	0.00
EM02-1	30	30	0	0.00												
EM02-2	25	25	1	4.00		1										
EM02-3	25	25	0	0.00												
EM02-4	25	25	1	4.00	1									1		
Total:	105	105	2		1	1	0	0	0	0	0	0	0	1	0	0
Means (based or	n initial larval co	ount):		2.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
Grand Means:				2.42	1.92	1.00	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.92	0.00	0.00
Var (S2)				0.35	1.68	0.00	0.00	0.00	0.35	0.00	0.00	0.00	0.00	0.01	0.00	0.00
SEM				0.42	0.92	0.00	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.08	0.00	0.00
CV (%)				24.38	67.64	0.00	na	na	141.42	na	na	na	na	12.86	na	na

STAGE 22, 5/2/2000, DAY 13

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				T	PE OF M	ALFORMA	ATION (E	ELTS OBS	ERVED)	1		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	30	19	0	0.00												
EM01-2	25	8	0	0.00												
EM01-3	25	4	0	0.00												
EM01-4	25	19	0	0.00												
Total:	105	50	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based or	n initial larval co	ount):		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EM02-1	30	30	0	0.00												
EM02-2	25	25	1	4.00		1										
EM02-3	25	25	0	0.00												
EM02-4	25	24	1	4.00	1											
Total:	105	104	2		1	1	0	0	0	0	0	0	0	0	0	0
Means (based or	n initial larval co	ount):		2.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grand Means: Var (S2) SEM CV (%)				1.00 2.00 0.50 141.42	0.50 0.50 0.25 141.42	0.50 0.50 0.25 141.42	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na

STAGE 23, 5/8/2000, DAY 19

SAMPLE	INITIAL No. LARVAE	No. of	NUMBER	%				Τ\	DE OF M	AL EODM	ATION (D	ELTE ODE	EDVED			
ID	at DAY 0	LARVAE LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	ELTS OBSI MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	30	16	0	0.00												
EM01-2	25	7	0	0.00												
EM01-3	25	3	0	0.00												
EM01-4	25	13	0	0.00												
Total:	105	39	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based or	n initial larval co	ount):		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EM02-1	30	0	na	na												
EM02-2	25	25	1	4.00		1										
EM02-3	25	23	0	0.00												
EM02-4	25	21	0	0.00												
Total:	105	69	1		0	1	0	0	0	0	0	0	0	0	0	0
Means (based or	n initial larval co	ount):		1.33	0.00	1.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grand Means:				0.67	0.00	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Var (S2)				0.89	0.00	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEM				0.33	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CV (%)				141.42	na	141.42	na	na	na	na	na	na	na	na	na	na

STAGE 24, 5/19/2000, DAY 30

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				T	PE OF M	ALFORMA	ATION (E	ELTS OBS	ERVED)	1		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	30	1	0	0.00												
EM01-2	25	6	0	0.00												
EM01-3	25	3	0	0.00												
EM01-4	25	1	0	0.00												
Total:	105	11	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based o	on initial larval co	ount):		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EM02-1	30	0	na	na												
EM02-2	25	3	0	0.00												
EM02-3	25	6	0	0.00												
EM02-4	25	11	0	0.00												
Total:	105	20	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based o	on initial larval co	ount):		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grand Means: Var (S2) SEM CV (%)				0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na

STAGE 24, 5/26/2000, DAY 37

044401.5	INITIAL No.	No. of														
SAMPLE	LARVAE	LARVAE				T. 1.11	NOTOGUODO								0.1.001.1.0	OTUNITED
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM04.4	00	4		0.00												
EM01-1	30	1	0	0.00												
EM01-2	25	6	0	0.00												
EM01-3	25	3	0	0.00												
EM01-4	25	1	0	0.00												
Total:	105	11	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based o	n initial larval co	ount):		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EM02-1	30	0	na	na												
EM02-2	25	2	0	0.00												
EM02-3	25	6	0	0.00												
EM02-4	25	9	0	0.00												
Total:	105	17	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based o	n initial larval co	ount):		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grand Means: Var (S2) SEM				0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00
CV (%)				na	na	na	na	na	na	na	na	na	na	na	na	na

STAGE 24, 5/31/2000, DAY 42

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	ALFORM	ATION (E	ELTS OBS	ERVED)			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM04.4	20	4		0.00												
EM01-1	30	1	0	0.00												
EM01-2	25	6	0	0.00												
EM01-3	25	3	0	0.00												
EM01-4	25	1	0	0.00												
Total:	105	11	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based o	on initial larval co	ount):		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EM02-1	30	0	na	na												
EM02-2	25	2	0	0.00												
EM02-3	25	6	0	0.00												
EM02-4	25	4	0	0.00												
Total:	105	12	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based o	on initial larval co	ount):		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grand Means: Var (S2) SEM CV (%)				0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na

STAGE 26, 6/13/2000, DAY 55

	INITIAL No.	No. of						_								
SAMPLE	LARVAE	LARVAE	NUMBER	%								ELTS OBS				
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	30	1	0	0.00												
EM01-2	25	5	0	0.00												
EM01-3	25	1	0	0.00												
EM01-4	25	1	0	0.00												
Total:	105	8	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based or	n initial larval co	ount):		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
,		,														
EM02-1	30	0	na	na												
EM02-2	25	2	0	0.00												
EM02-3	25	3	0	0.00												
EM02-4	25	3	0	0.00												
Total:	105	8	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based or	n initial larval co	ount):		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Grand Means:				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Var (S2)				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEM				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CV (%)				na	na	na	na	na	na	na	na	na	na	na	na	na
₩ (70)				ila	110	110	ila	110	110	i i a	110	ila	110	ila	ila	i i d

STAGE 28, 7/5/2000, DAY 77

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				T	PE OF M	ALFORM	ATION (E	ELTS OBS	ERVED)			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	30	1	0	0.00												
EM01-2	25	5	0	0.00												
EM01-3	25	1	0	0.00												
EM01-4	25	1	Ö	0.00												
Total:	105	8	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based o	n initial larval co	ount):		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EM02-1	30	0	na	na												
EM02-2	25	2	0	0.00												
EM02-3	25	3	0	0.00												
EM02-4	25	3	0	0.00												
Total:	105	8	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based o	n initial larval co	ount):		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grand Means:				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Var (S2)				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEM				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CV (%)				na	na	na	na	na	na	na	na	na	na	na	na	na

STAGE 36-37 (1>STAGE 38), 8/8/2000, DAY 111

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				т\	/DE OE M	AL FORM	ATION (D	ELTE ORE	EBVED)			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	30	1	0	0.00												
EM01-2	25	5	0	0.00												
EM01-3	25	1	0	0.00												
EM01-4	25	0	na	na												
Total:	105	7	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based or	n initial larval co	ount):		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EM02-1	30	0	na	na												
EM02-2	25	2	0	0.00												
EM02-3	25	3	0	0.00												
EM02-4	25	3	0	0.00												
Total:	105	8	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based or	n initial larval co	ount):		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grand Means:				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Var (S2)				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEM				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CV (%)				na	na	na	na	na	na	na	na	na	na	na	na	na

GRAND MEANS OF COMBINED LARVAL MALFORMATION DATA

NUMBER	%				TY	PE OF M.	<u>ALFORMA</u>	ATION (D	ELTS OBSI	ERVED)				
MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED	
•														
Grand Means:	0.69	0.38	0.37	0.00	0.00	0.13	0.00	0.00	0.00	0.08	0.09	0.00	0.00	
SEM	0.38	0.24	0.19	0.00	0.00	0.10	0.00	0.00	0.00	0.09	0.10	0.00	0.00	

HOUSATONIC RIVER PROJECT RANA pipiens DEVELOPMENTAL STUDY 2000 STAGE/MALFORMATION DATA SITE 37 (EW-3) 30.0 mg/Kg SEDIMENT PCB

STAGE 20, 5/9/2000, DAY 0

						ST	AGE 20, 5/9/2000	, DAY 0								
SAMPLE ID	INITIAL No. LARVAE at DAY 0	No. of LARVAE LIVING	NUMBER MALFORMED	% MAL.	EDEMA	TAIL	NOTOCHORD	TY FIN	YPE OF N	ALFORM BRAIN	ATION (D	ELTS OBS	GUT	HEMORRHAGE	CARDIAC	STUNTED
TP01-1	10	10	3	30.00		2			3		1	3				
TP01-1	0	0	na	na		2			3		'	3				
TP01-3	Ö	Ö	na	na												
TP01-4	Ö	Ö	na	na												
Total:	10	10	3		0	2	0	0	3	0	1	3	0	0	0	0
Means:				30.00	0.00	20.00	0.00	0.00	30.00	0.00	10.00	30.00	0.00	0.00	0.00	0.00
Var (S2)				na	na	na	na	na	na	na	na	na	na	na	na	na
SEM				na na	na	na na	na na	na na	na na	na	na na	na na	na na	na na	na na	na na
CV (%)				IId	na	IId	па	na	па	na	IIa	IIa	IId	па	IIa	IIa
						STA	GE 21, 5/19/2000	, DAY 10)							
	INITIAL No.	No. of														
SAMPLE ID	LARVAE at DAY 0	LARVAE LIVING	NUMBER MALFORMED	% MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	ALFORM BRAIN	ATION (D EYE	MOUTH		HEMORRHAGE	CARDIAC	STUNTED
TP01-1	10	9	5	50.00	3	4		2	2		1					
TP01-2	0	0	na	na												
TP01-3	0	0	na	na												
TP01-4	0	0	na	na												
Total:	10	9	5		3	4	0	2	2	0	1	0	0	0	0	0
Moans (hasod o	on initial larval co	ount):		50.00	30.00	40.00	0.00	20.00	20.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00
Var (S2)	on middi idi vai ci	ount).		na	na	na	na	na	na	na	na	na	na	na	na	na
SEM				na	na	na	na	na	na	na	na	na	na	na	na	na
CV (%)				na	na	na	na	na	na	na	na	na	na	na	na	na
, ,																
						STA	GE 21, 5/26/2000	, DAY 17	,							
SAMPLE	INITIAL No. LARVAE	No. of	NUMBER	0/				т.	VDE OF N	AL FORM	ATION (D	ELTE OBS	EDVED			
ID	at DAY 0	LARVAE LIVING	MALFORMED	% MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
TP01-1	10	8	4	40.00	2	4			2		1					
TP01-2	0	Ō	na	na	-	•			-							
TP01-3	Ō	0	na	na												
TP01-4	0	0	na	na												
Total:	10	8	4		2	4	0	0	2	0	1	0	0	0	0	0
			•	40.00												
Var (S2)	on initial larval co	ount):		40.00 na	20.00 na	40.00 na	0.00 na	0.00 na	20.00 na	0.00 na	10.00 na	0.00 na	0.00 na	0.00 na	0.00 na	0.00 na
SEM				na	na	na	na	na	na	na	na	na	na	na	na	na
CV (%)				na	na	na	na	na	na	na	na	na	na	na	na	na
						SIA	GE 22, 5/31/2000	, DAY 22								
SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	YPE OF N	ALFORM	ATION (D	ELTS OBS	ERVED))		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
TP01-1	10	3	3	30.00	3	2			2		1	2		2	1	
TP01-1	0	0	na	na	3	2			4		'	-		2	'	
TP01-3	Ö	Ö	na	na												
TP01-4	Ö	Ö	na	na												
Tatali	40	2	2		2	2	0	0	2	0	4	2	0	2	4	0
Total:	10	3	3		3	2	0	0	2	0	1	2	0	2	1	0
	on initial larval co	ount):		30.00	30.00	20.00	0.00	0.00	20.00	0.00	10.00	20.00	0.00	20.00	10.00	0.00
Var (S2)				na	na	na	na	na	na	na	na	na	na	na	na	na
SEM				na	na	na	na	na	na	na	na	na	na	na	na	na
CV (%)				na	na	na	na	na	na	na	na	na	na	na	na	na
				_	DAND ME	ANG OF C	OMBINED LAST	A. 864	-ODI	ON D 4 T *						
					KANU MEA	ANS OF C	OMBINED LARV									
			NUMBER MALFORMED	% MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	ALFORM BRAIN	ATION (D EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
			Grand Means:	37.50	20.00	30.00	0.00	5.00	22.50	0.00	10.00	12.50	0.00	5.00	2.50	0.00
			SEM	9.57	14.14	11.55	0.00	10.00	5.00	0.00	0.00	15.00	0.00	10.00	5.00	0.00

HOUSATONIC RIVER PROJECT RANA pipiens DEVELOPMENTAL STUDY 2000 STAGE/MALFORMATION DATA SITE 39 (W-1) 0.15 mg/Kg SEDIMENT PCB

STAGE 21, 4/25/2000, DAY 0

						ST	AGE 21, 4/25/2000	, DAY 0								
SAMPLE ID	INITIAL No. LARVAE at DAY 0	No. of LARVAE LIVING	NUMBER MALFORMED	% MAL.	EDEMA	TAIL	NOTOCHORD	T'	YPE OF M	ALFORMA BRAIN	ATION (D	ELTS OBS	ERVED) GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	30	30	1	3.33		1										
EM01-2	25	25	1	4.00	1											
EM01-3	25	25	0	0.00												
EM01-4	25	25	0	0.00												
Total:	105	105	2		1	1	0	0	0	0	0	0	0	0	0	0
Means:				1.83	1.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Var (S2)				4.56	na	na	na	na	na	na	na	na	na	na	na	na
SEM				1.07	na	na	na	na	na	na	na	na	na	na	na	na
CV (%)				116.42	na	na	na	na	na	na	na	na	na	na	na	na
						ST	AGE 22, 5/2/2000,	DAY 7								
	INITIAL No.	No. of														
SAMPLE	LARVAE	LARVAE	NUMBER	% MAL.	EDEMA	TAII	NOTOGLIODO					ELTS OBS		LIEMODDIMOE	OARRIAG	OTUNITED
ID	at DAY 0	LIVING	MALFORMED	WAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	30	30	1	3.33		1										
EM01-2	25	25	1	4.00	1											
EM01-3	25	25	0	0.00												
EM01-4	25	25	0	0.00												
Total:	105	105	2		1	1	0	0	0	0	0	0	0	0	0	0
Means (based o	on initial larval co	ount):		1.83	1.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Var (S2)				4.56	na	na	na	na	na	na	na	na	na	na	na	na
SEM				1.07	na	na	na	na	na	na	na	na	na	na	na	na
CV (%)				116.42	na	na	na	na	na	na	na	na	na	na	na	na
						STA	AGE 23, 5/19/2000,	DAY 24	ı							
	INITIAL No.	No. of														
SAMPLE ID	LARVAE at DAY 0	LARVAE LIVING	NUMBER MALFORMED	% MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	ALFORMA BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	30	5	0	0.00												
EM01-2	25	0	na	na												
EM01-3	25	1	0	0.00												
EM01-4	25	12	0	0.00												
Total:	105	18	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based o	on initial larval co	ount):		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Var (S2)		· · · · · · · ·		na	na	na	na	na	na	na	na	na	na	na	na	na
SEM				na	na	na	na	na	na	na	na	na	na	na	na	na
CV (%)				na	na	na	na	na	na	na	na	na	na	na	na	na
						QT/	AGE 23, 5/26/2000,	DAV 34	ı							
	INITIAL No.	No. of				017	10L 10, 0/10/1000,	DAT 0								
SAMPLE	LARVAE	LARVAE	NUMBER	%				T	YPE OF M	ALFORMA	ATION (D	ELTS OBS	ERVED)			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE`	MOUTH		HEMORRHAGE	CARDIAC	STUNTED
EM01-1	30	4	2	6.67	1	2					1					
EM01-2	25	0	na	na	•	-					•					
EM01-3	25	1	0	0.00												
EM01-4	25	12	6	24.00	4	5			3		2			2		
Total:	105	17	8		5	7	0	0	3	0	3	0	0	2	0	0
Means (hased o	on initial larval co	ount).		10.22	6.44	8.89	0.00	0.00	4.00	0.00	3.78	0.00	0.00	2.67	0.00	0.00
Var (S2)				153.48	4.50	4.50	na o.oo	na	na	na	0.50	na	na	na	na	na
SEM				7.15	1.50	1.50	na	na	na	na	0.50	na	na	na	na	na
CV (%)				121.19	32.92	23.86	na	na	na	na	18.72	na	na	na	na	na
· · · /									-	-		-		-	-	-

HOUSATONIC RIVER PROJECT RANA pipiens DEVELOPMENTAL STUDY 2000 STAGE/MALFORMATION DATA SITE 39 (W-1) 0.15 mg/Kg SEDIMENT PCB

STAGE 24, 5/31/2000, DAY 36

EMDI-1							STA	AGE 24, 5/31/2000,	DAY 36	i							
Marie 100		LARVAE	LARVAE			EDEMA	TAIL	NOTOCHORD								CARDIAC	STUNTED
Maria 10	EM01-1	30	4	0	0.00												
Part																	
Total: 105							1										
1											•						
Second S	Total:	105	16	1		0	1	0	0	0	0	0	0	0	0	0	0
September		n initial larval co	ount):														
No. No.																	
NUMBER N																	
SAMPLE LARVAE LARVAE LARVAE MALFORMET MALF							STA	AGE 25, 6/13/2000,	DAY 49	ı							
Ministration Mini	SAMPI F			NUMBER	%				T	PF OF M	IAI FORM	ΔΤΙΟΝ (Γ	FLTS OBS	FRVFD)			
EMD1-2 25 0 1 0 0.00 0.00 0.00 0.00 0.00 0.00 0.						EDEMA	TAIL	NOTOCHORD								CARDIAC	STUNTED
Maria Mari																	
Total: 105																	
Sample																	
Sample	Total:	105	16	0		0	0	0	0	0	0	0	0	0	0	0	0
Name																	
SAMPLE NITIAL No. No. of LARVAE NUMBER MALFORMED N. of LARVAE N. of		n initial larval co	ount):														
NITTAL No. No. of NUMBER Demonstration																	
Name	CV (%)				na	na	na	na	na	na	na	na	na	na	na	na	na
MAIL LARVAE LARVAE LARVAE LARVAE LARVAE MAIL MAIL DEMA TAIL NOTOCHORD FIN FACE BRAIN EVE MOUTH GUT HEMORRHAGE CARDIAC STUNTE							ST	AGE 27, 7/5/2000,	DAY 71								
Malform Malf	SAMPI F			NUMBER	%				T	/PF OF M	IAI FORM	ΔΤΙΩΝ (Γ	IFI TS ORS	FRVFD)			
EMO1-2 25 0 0 na na na EMO1-4 25 111 00 0.00 Total: 105 15 0 0 - 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						EDEMA	TAIL	NOTOCHORD								CARDIAC	STUNTED
EMO1-3 25 0 na na na na na na na na na na na na na	EM01-1	30	4	0	0.00												
## Total: 105 15 0																	
STAGE 37-40, 8/8/2000, DAY 105 SAMPLE LARVAE LARV																	
Var (\$2 SEM CV (%)	Total:	105	15	0		0	0	0	0	0	0	0	0	0	0	0	0
Var (\$2 SEM CV (%)	Means (based o	n initial larval co	ount):		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STAGE 37-40, 8/8/2000, DAY 105 SAMPLE LARVAE LARVAE LARVAE AT DAY 0 LIVING MALFORMED MAL. EDEMA TAIL NOTOCHORD FIN FACE BRAIN EYE MOUTH GUT HEMORRHAGE CARDIAC STUNTE EM01-1 30 4 0 0.00 EM01-2 25 0 0 na na EM01-1 25 10 0 0 0.00 EM01-2 25 10 0 na na EM01-4 25 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Var (S2)		,									na					
No. of LARVAE LAR																	
SAMPLE LARVAE LARVAE LARVAE LIVING MALFORMED MAL EDEMA TAIL NOTOCHORD FIN FACE BRAIN EYE MOUTH GUT HEMORRHAGE CARDIAC STUNTE							STAG	GE 37-40, 8/8/2000	, DAY 10)5							
ID																	
EM01-1 30 4 0 0.00 EM01-2 25 0 na na na EM01-3 25 0 na na na EM01-4 25 10 0 0 0.00 Total: 105 14 0 0 0.00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						EDEMA	TAIL	NOTOCHORD								CARDIAC	STUNTED
EM01-2 25 0 na na na na na EM01-3 25 0 na na na na na na na na na na na na na																	
EM01-3 25 0 na na na EM01-4 25 10 0 0 0.00 Total: 105 14 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0																	
Total: 105 14 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	EM01-3	25	0	na	na												
Caral Means: 1.90 1.06 1.49 0.00 0	EM01-4	25	10	0	0.00												
Var (S2) na <	Total:	105	14	0		0	0	0	0	0	0	0	0	0	0	0	0
SEM		n initial larval co	ount):														
CV (%) GRAND MEANS OF COMBINED LARVAL MALFORMATION DATA NUMBER MALFORMED MALFORMED MALFORMED MALFORMED Grand Means: 1.90 1.06 1.49 0.00 0.00 0.50 0.00 0.47 0.00 0.00 0.33 0.00 0.00																	
NUMBER % MALFORMED MAL. EDEMA TAIL NOTOCHORD FIN FACE BRAIN EYE MOUTH GUT HEMORRHAGE CARDIAC STUNTE Grand Means: 1.90 1.06 1.49 0.00 0.00 0.50 0.00 0.47 0.00 0.00 0.33 0.00 0.00																	
NUMBER % MALFORMED MAL. EDEMA TAIL NOTOCHORD FIN FACE BRAIN EYE MOUTH GUT HEMORRHAGE CARDIAC STUNTE Grand Means: 1.90 1.06 1.49 0.00 0.00 0.50 0.00 0.47 0.00 0.00 0.33 0.00 0.00					G	RAND MEA	ANS OF C	COMBINED LARV	AL MALF	ORMATI	ON DATA						
MALFORMED MAL. EDEMA TAIL NOTOCHORD FIN FACE BRAIN EYE MOUTH GUT HEMORRHAGE CARDIAC STUNTE Grand Means: 1.90 1.06 1.49 0.00 0.00 0.50 0.00 0.47 0.00 0.00 0.33 0.00 0.00				NUMBER		_						ATION (F	ELTS ORS	ERVFD			
						EDEMA	TAIL	NOTOCHORD								CARDIAC	STUNTED
SEM 1.73 1.11 1.52 0.00 0.00 0.71 0.00 0.67 0.00 0.00 0.47 0.00 0.00																	
				SEM	1.73	1.11	1.52	0.00	0.00	0.71	0.00	0.67	0.00	0.00	0.47	0.00	0.00

HOUSATONIC RIVER PROJECT RANA pipiens DEVELOPMENTAL STUDY 2000 STAGE/MALFORMATION DATA R3 EXTERNAL REFERENCE LARVAE IN REFERENCE SITE 40 (MP), 0.04 mg/Kg SEDIMENT PCB

STAGE 20, 5/24/2000, DAY 0

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	ALFORM	ATION (D	ELTS OBS	ERVED)	1		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	20	20	0	0.00												
EM01-2	20	20	0	0.00												
EM01-2	20	20	0	0.00												
EM01-4	20	20	0	0.00												
EIVIO 1-4	20	20	U	0.00												
Total:	80	80	0		0	0	0	0	0	0	0	0	0	0	0	0
Means:				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EM02-1	20	20	0	0.00												
EM02-2	20	20	0	0.00												
EM02-3	20	20	0	0.00												
EM02-4	20	20	0	0.00												
Total:	80	80	0		0	0	0	0	0	0	0	0	0	0	0	0
Means:				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grand Means: Var (S2) SEM CV (%)				0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na

STAGE 23, 5/31/2000, DAY 7

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				т\	DE OE M	AI EODM	ATION (D	ELTS OBSI	EDVEN)			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
																,
EM01-1	20	20	0	0.00												
EM01-2	20	18	0	0.00												
EM01-3	20	17	0	0.00												
EM01-4	20	17	0	0.00												
Total:	80	72	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based o	on initial larval co	ount):	Means:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EM02-1	20	16	0	0.00												
EM02-2	20	18	0	0.00												
EM02-3	20	17	0	0.00												
EM02-4	20	19	0	0.00												
Total:	80	70	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based o	on initial larval co	ount):	Means:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grand Means: Var (S2)				0.00	0.00	0.00	0.00 0.00	0.00	0.00	0.00	0.00	0.00 0.00	0.00	0.00 0.00	0.00	0.00 0.00
SEM CV (%)				0.00 na	0.00 na	0.00 na	0.00 na	0.00 na	0.00 na	0.00 na	0.00 na	0.00 na	0.00 na	0.00 na	0.00 na	0.00 na

HOUSATONIC RIVER PROJECT RANA pipiens DEVELOPMENTAL STUDY 2000 STAGE/MALFORMATION DATA R3 EXTERNAL REFERENCE LARVAE IN REFERENCE SITE 40 (MP), 0.04 mg/Kg SEDIMENT PCB

STAGE 25, 6/13/2000, DAY 20

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	ALFORMA	ATION (E	ELTS OBS	ERVED)			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	20	20	0	0.00												
EM01-2	20	17	0	0.00												
EM01-3	20	17	0	0.00												
EM01-4	20	17	0	0.00												
EIVIO 1-4	20	17	U	0.00												
Total:	80	71	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based o	n initial larval co	ount):		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EM02-1	20	15	0	0.00												
EM02-2	20	18	0	0.00												
EM02-3	20	17	0	0.00												
EM02-4	20	19	0	0.00												
Total:	80	69	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based o	n initial larval co	ount):		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grand Means: Var (S2) SEM CV (%)				0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na

STAGE 29, 7/5/2000, DAY 42

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				T	PE OF M	ALFORM	ATION (E	ELTS OBS	ERVED			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
			_													
EM01-1	20	20	0	0.00												
EM01-2	20	16	0	0.00												
EM01-3	20	17	0	0.00												
EM01-4	20	16	1	5.00		1										
Total:	80	69	1		0	1	0	0	0	0	0	0	0	0	0	0
Means (based o	n initial larval co	ount):		1.25	0.00	1.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EM02-1	20	15	0	0.00												
EM02-2	20	18	0	0.00												
EM02-3	20	17	1	5.00		1	1									
EM02-4	20	18	0	0.00												
Total:	80	68	1		0	1	1	0	0	0	0	0	0	0	0	0
Means (based o	n initial larval co	ount):		1.25	0.00	1.25	1.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grand Means:				1.25	0.00	1.25	0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Var (S2)				0.00	0.00	0.00	0.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEM				0.00	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CV (%)				0.00	na	0.00	141.42	na	na	na	na	na	na	na	na	na
. ,																

HOUSATONIC RIVER PROJECT RANA pipiens DEVELOPMENTAL STUDY 2000 STAGE/MALFORMATION DATA R3 EXTERNAL REFERENCE LARVAE IN REFERENCE SITE 40 (MP), 0.04 mg/Kg SEDIMENT PCB

STAGE 30, 7/11/2000, DAY 48

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	ALFORMA	ATION (D	ELTS OBS	ERVED)	1		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	20	20	0	0.00												
EM01-2	20	16	4			4	4									
				5.00		1	1									
EM01-3	20	17	2	10.00		2	2									
EM01-4	20	16	0	0.00												
Total:	80	69	3		0	3	3	0	0	0	0	0	0	0	0	0
Means (based or	n initial larval co	ount):		3.75	0.00	3.75	3.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EM02-1	20	15	5	25.00		5	4		2			3		1		
EM02-2	20	18	5	25.00		5	5	3	4			5				
EM02-3	20	17	6	30.00		5	4	1	4			5		1		1
EM02-4	20	18	8	40.00		8	7	4	6	1		7		2		
Total:	80	68	24		0	23	20	8	16	1	0	20	0	4	0	1
Means (based or	n initial larval co	ount):		30.00	0.00	28.75	25.00	10.00	20.00	1.25	0.00	25.00	0.00	5.00	0.00	1.25
Grand Means: Var (S2) SEM CV (%)				16.88 344.53 13.13 109.99	0.00 0.00 0.00 na	16.25 312.50 12.50 108.79	14.38 225.78 10.63 104.53	5.00 50.00 5.00 141.42	10.00 200.00 10.00 141.42	0.63 0.78 0.63 141.42	0.00 0.00 0.00 na	12.50 312.50 12.50 141.42	0.00 0.00 0.00 na	2.50 12.50 2.50 141.42	0.00 0.00 0.00 na	0.63 0.78 0.63 141.42

STAGE 38, 8/8/2000, DAY 76

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				т\	DE OE M	AL EODM	ATION (D	ELTS OBS	EDVED			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CAPDIAC	STUNTED
	atDATO	LIVING	WALIONWED	WAL.	LULIVIA	IAIL	NOTOCHORD	1 111	TAGE	DIVAIN	LIL	WOOTT	001	TILMOTTRIAGE	CANDIAC	STONTED
EM01-1	20	13	1	5.00		1										
EM01-2	20	15	1	5.00		1										
EM01-3	20	15	1	5.00		1			1							
EM01-4	20	16	1	5.00		1	1		1							
Total:	80	59	4		0	4	1	0	2	0	0	0	0	0	0	0
Means (based o	n initial larval co	ount):		5.00	0.00	5.00	1.25	0.00	2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EM02-1	20	15	0	0.00												
EM02-2	20	18	0	0.00												
EM02-3	20	16	0	0.00												
EM02-4	20	17	0	0.00												
Total:	80	66	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based o	n initial larval co	ount):		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grand Means:				2.50	0.00	2.50	0.63	0.00	1.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Var (S2)				12.50	0.00	12.50	0.78	0.00	3.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEM				2.50	0.00	2.50	0.63	0.00	1.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CV (%)				141.42	na	141.42	141.42	na	141.42	na	na	na	na	na	na	na

GRAND MEANS OF COMBINED LARVAL MALFORMATION DATA

NUMBER	%				T١	PE OF M	ALFORMA	ATION (E	ELTS OBS	ERVED))		
MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
Grand Means:	3.44	0.00	3.33	2.60	0.83	1.88	0.10	0.00	2.08	0.00	0.42	0.00	0.10
SEM	2.35	0.00	2.26	2.04	0.72	1.42	0.09	0.00	1.80	0.00	0.36	0.00	0.09

RANA pipiens DEVELOPMENTAL STUDY 2000 GROWTH DATA SUMMARY

SITE 34

	SITE W-7a (18.0 mg/Kg Sec	I PCB) Reps=4, 105 Days*	
STUDY Day	DEVELOPMENTAL STAGE	MEAN GROWTH (cm)	SEM
0	20	1.323	0.022
7	20	1.504	0.019
13	20	1.504	0.030
24	21	1.793	0.043
31	21	1.918	0.080
36	22	2.017	0.053
49	22	2.575	0.072
71	23	3.824	0.162
105	27	4.475	0.145

SITE 35

	SITE W-6 (42.0 mg/Kg Sec	I PCB) Reps=4, 91 Days*	
STUDY Day	DEVELOPMENTAL STAGE	MEAN GROWTH (cm)	SEM
0	20	1.268	0.020
10	21	1.664	0.058
17	21	1.628	0.027
22	22	1.881	0.046
35	22	2.573	0.112
57	23	4.366	0.107
91	27	4.482	0.099

SITE 36

SITE W-4 (0.46 mg/Kg Sed PCB) Reps=8, 111 Days*				
STUDY	DEVELOPMENTAL	MEAN GROWTH		
DAY	STAGE	(cm)	SEM	
0	20	0.933	0.056	
6	21	1.174	0.018	
13	22	1.350	0.067	
19	23	1.450	0.071	
30	24	2.161	0.266	
37	24	2.301	0.357	
42	24	2.536	0.404	
55	26	3.316	0.453	
77	28	4.786	0.798	
111	37	4.510	0.036	

RANA pipiens DEVELOPMENTAL STUDY 2000 GROWTH DATA SUMMARY

SITE 37

SITE EW-3 (30.0 mg/Kg Sed PCB) Reps=1, 22 Days*				
STUDY DAY	DEVELOPMENTAL STAGE	MEAN GROWTH (cm)	SEM	
0	20	1.469	0.054	
10	21	1.877	0.072	
17	21	1.956	0.072	
22	22	2.033	0.107	

SITE 39

SITE W-1 (0.15 mg/Kg Sed PCB) Reps=4, 105 Days*			
STUDY Day	DEVELOPMENTAL STAGE	MEAN GROWTH (cm)	SEM
0	21	0.903	0.015
7	22	1.372	0.022
13	22	1.334	0.004
24	23	2.138	0.194
31	23	2.491	0.655
36	24	2.546	0.716
49	25	3.186	0.767
71	27	3.387	0.304
105	40	3.880	0.246

REFERENCE SITE DATA SHARED WITH CROSSOVER STUDY R3 LARVAE IN SITE 40 WATER/SEDIMENT

R3 Ref Larvae in Site MP (0.04 mg/kg Sed PCB) Reps=8, 76 Days*				
STUDY DAY	DEVELOPMENTAL STAGE	MEAN GROWTH (cm)	SEM	
5711	0.7.02	(6)	<u> </u>	
0	20	1.018	0.010	
7	23	1.488	0.022	
20	25	2.311	0.073	
42	29	3.579	0.028	
48	30	3.803	0.029	
76	38	4.383	0.048	

^{*}Test Duration.

	EM01-1	EM01-2	EM01-3	EM01-4
DATE 04/25/00 STUDY DAY 0 STAGE 20	1.318 1.377 1.420 1.144 1.290 1.137 1.306 1.208 1.352 1.208 1.352 1.208 1.415 1.339 1.228 1.304 1.204 1.422 1.382 1.177 1.246 1.247 1.263 1.213 1.224 1.277 1.209 1.406 1.302 1.566 1.586	1.424 1.366 1.389 1.359 1.359 1.482 1.399 1.268 1.364 1.403 1.364 1.379 1.453 1.400 1.377 1.343 1.318 1.447 1.137 1.327 1.281 1.352 1.402 1.550 1.554	1.382 1.416 1.295 1.360 1.290 1.340 1.304 1.421 1.345 1.339 1.378 1.300 1.390 1.331 1.221 1.339 1.455 1.352 1.278 1.275 1.314 1.205 1.352 1.272 1.366	1.318 1.345 1.370 1.287 1.318 1.339 1.304 1.351 1.231 1.277 1.211 1.178 1.253 1.253 1.159 1.377 1.204 1.276 1.156 1.154 1.238 1.395 1.389 1.302 1.302
Individual Statistics N Mean Var. (S²) SEM	30 1.302 0.012 0.020	25 1.380 0.007 0.017	25 1.333 0.004 0.012	25 1.279 0.006 0.015
Site Average Total N Site Mean Var. (S ²) SEM	105 1.323 0.002 0.022			

	EM01-1	EM01-2	EM01-3	EM01-4
DATE 05/02/00 STUDY DAY 7 STAGE 20	1.546 1.294 1.429 1.491 1.353 1.316 1.408 1.455 1.429 1.151 1.543 1.453 1.506 1.380 1.528 1.605 1.543 1.488 1.655 1.543 1.569 1.505 1.543 1.569 1.502 1.523 1.569 1.503 1.470 1.482 1.402	1.555 1.464 1.666 1.682 1.461 1.602 1.517 1.461 1.576 1.575 1.429 1.565 1.461 1.576 1.285 1.327 1.540 1.402 1.280 1.258 1.182 1.484 1.556 1.608 1.330	1.384 1.457 1.444 1.551 1.582 1.480 1.560 1.551 1.467 1.570 1.587 1.618 1.564 1.558 1.515 1.468 1.646 1.587 1.617 1.486 1.428 1.549 1.451 1.464 1.663	1.617 1.348 1.608 1.608 1.617 1.544 1.649 1.699 1.602 1.519 1.567 1.586 1.438 1.351 1.353 1.434 1.506 1.498 1.614 1.510 1.568 1.517 1.564 1.719
Individual Statist N Mean Var. (S²) SEM	30 1.474 0.010 0.019	25 1.473 0.018 0.027	25 1.530 0.005 0.015	25 1.545 0.010 0.020
Site Average Total N Site Mean Var. (S ²) SEM	105 1.506 0.001 0.019	0.021	0.015	0.020

	EM01-1	EM01-2	EM01-3	EM01-4
DATE 05/08/00	1.494 1.628 1.623	1.314 1.421 1.296	1.607 1.433 1.440	1.680 1.353 1.521
STUDY DAY 13 STAGE 20	1.530 1.610 1.498 1.320 1.299 1.499 1.437 1.545 1.393 1.419 1.500 1.707 1.616 1.463 1.557 1.461 1.411	1.274 1.399 1.535 1.535 1.577 1.275 1.595 1.605 1.613 1.510 1.463 1.589 1.566 1.478 1.463 1.310	1.556 1.605 1.510 1.364 1.728 1.643 1.456 1.425 1.408 1.352 1.478 1.340 1.455 1.408 1.662 1.526 1.605	1.717 1.583 1.437 1.460 1.553 1.609 1.737 1.650 1.595 1.511 1.595 1.579 1.625 1.660 1.581 1.563 1.522
	1.411 1.182 1.286 1.343 1.373 1.437 1.432 1.333 1.030 1.443 1.421	1.430 1.436 1.510 1.501	1.509 1.648 1.649 1.521	1.788 1.649 1.580 1.476
Individual Statist N Mean Var. (S ²) SEM	30 1.443 0.020 0.026	24 1.476 0.015 0.025	24 1.514 0.012 0.022	24 1.584 0.010 0.020
Site Average Total N Site Mean Var. (S²) SEM	102 1.504 0.004 0.030			

	EM01-1	EM01-2	EM01-3	EM01-4
	4.005	4 740	4.050	4.500
	1.935	1.710	1.856	1.593
DATE	1.703	2.001	1.555	1.367
05/19/00	1.972	1.955	1.726	1.551
	2.233	1.962	1.915	1.518
STUDY DAY	1.726	1.769	1.915	1.762
24	1.635	1.915	1.670	1.535
	1.868	1.815	1.951	1.563
STAGE	1.588		1.699	1.811
21	1.507		2.039	1.978
	1.785		1.746	1.684
	1.611		1.770	1.742
	2.036		1.880	1.918
	1.720		1.885	1.633
	1.989			1.779

Individual Statisti	ics			
N	14	7	13	14
Mean	1.808	1.875	1.816	1.674
Var. (S ²)	0.042	0.012	0.018	0.028
SEM	0.055	0.042	0.037	0.045
Site Average Total N Site Mean Var. (S ²) SEM	48 1.793 0.007 0.043			

_	EM01-1	EM01-2	EM01-3	EM01-4
DATE 05/26/00	2.246 1.587 2.562	1.983 2.220 2.118	1.804 1.998 2.201	1.780 1.830 1.588
STUDY DAY 31	1.793 1.962 1.773	1.963 2.112 1.872	1.947	1.765 1.880 1.648
STAGE 21	1.976 2.161 2.184 2.279 2.113 1.899 0.098	2.314		1.462

•				
Individual Statisti	cs			
N	13	7	4	7
Mean	1.895	2.083	1.988	1.708
Var. (S ²)	0.357	0.024	0.027	0.022
SEM	0.166	0.058	0.082	0.056
Site Average				
•	0.4			
Total N	31			
Site Mean	1.918			
Var. (S ²)	0.026			
SEM	0.080			

_	EM01-1	EM01-2	EM01-3	EM01-4
	1.984	2.113	2.056	1.861
DATE	1.949	1.828	2.317	2.029
05/31/00	1.987	1.811	2.121	1.965
	1.897	1.915	2.132	
STUDY DAY	2.115	1.815		
36	2.660	2.052		
	2.138			
STAGE	2.346			
22	1.710			
	2.154			
	1.680			
	1.738			
	2.143			

Individual Statisti	cs			
N	13	6	4	3
Mean	2.038	1.922	2.157	1.952
Var. (S ²)	0.073	0.017	0.013	0.007
SEM	0.075	0.054	0.056	0.049
Site Average				
Total N	26			
Site Mean	2.017			
Var. (S ²)	0.011			
SEM	0.053			

	EM01-1	EM01-2	EM01-3	EM01-4
	3.483	2.569	2.366	2 200
DATE				3.309
DATE	1.946	2.505	2.796	2.486
06/13/00	2.385	2.822	3.046	2.030
	2.190		2.566	
STUDY DAY	2.108			
49	2.141			
	2.032			
STAGE	2.732			
22	2.497			
	2.153			

		_	·	
Individual Statisti	cs			
N	10	3	4	3
Mean	2.367	2.632	2.694	2.608
Var. (S ²)	0.209	0.028	0.086	0.420
SEM	0.145	0.097	0.147	0.374
Site Average				
Total N	20			
Site Mean	2.575			
Var. (S ²)	0.021			
SEM	0.072			

_	EM01-1	EM01-2	EM01-3	EM01-4
	3.329	4.516	3.951	3.440
DATE	2.884	3.997	2.641	4.566
07/05/00	3.960	3.937	3.468	3.518
	5.535		3.450	
STUDY DAY	4.289			
71	3.559			
STAGE 23				

Individual Statis	stics			
N	6	3	4	3
Mean	3.926	4.150	3.378	3.841
Var. (S ²)	0.860	0.101	0.295	0.395
SEM	0.379	0.184	0.272	0.363
Site Average				
Total N	16			
Site Mean	3.824			
Var. (S ²)	0.105			
SEM	0.162			

_	EM01-1	EM01-2	EM01-3	EM01-4
	3.364	4.875	5.001	4.431
DATE	5.508	5.046	3.230	5.323
08/08/00	4.851	4.626	5.024	3.769
	3.293		4.298	
STUDY DAY	4.173			
105	3.738			
STAGE				
27				

Individual Statisti	ics			
N	6	3	4	3
Mean	4.155	4.849	4.388	4.508
Var. (S ²)	0.772	0.045	0.710	0.608
SEM	0.359	0.122	0.421	0.450
Site Average				
Total N	16			
Site Mean	4.475			
Var. (S ²)	0.084			
SEM	0.145			

_	TP01-1	TP01-2	TP01-3	TP01-4
	1 105	4 222	4 220	4 270
DATE	1.165	1.233	1.339	1.378
DATE	1.157	1.288	1.253	1.395
05/09/00	1.088	1.303	1.203	1.272
	1.316	1.157	1.255	1.265
STUDY DAY	1.200	1.132	1.203	1.262
0	1.382	1.236	1.227	1.245
	1.176	1.260	1.254	1.329
STAGE	1.321	1.321	1.347	1.284
20	1.151	1.236	1.268	1.264
	1.130	1.178	1.205	1.228
	1.236	1.299	1.372	1.337
	1.284	1.357	1.286	1.295
	1.178	1.176	1.272	1.269
	1.220	1.097	1.488	1.313
	1.262	1.228	1.481	1.236
	1.330	1.215	1.414	1.249
	1.150	1.406	1.410	1.283
	1.134	1.291	1.089	1.329
	1.183	1.205	1.357	1.257
	1.331	1.283	1.157	1.215
	1.200	1.150	1.428	1.365
	1.317	1.193	1.289	1.434
	1.337	1.185	1.353	1.499
	1.258	1.339	1.313	
	1.280	1.150	1.259	

ndividual Statisti	cs			
N	25	25	25	23
Mean	1.231	1.237	1.301	1.305
Var. (S ²)	0.007	0.006	0.010	0.005
SEM	0.016	0.015	0.020	0.015
Site Average				
Total N	98			
Site Mean	1.268			
Var. (S ²)	0.002			
SEM	0.020			

	TP01-1	TP01-2	TP01-3	TP01-4
	4.077	4.500	4.707	4.005
	1.977	1.593	1.797	1.635
DATE	1.631	1.382	1.450	1.422
05/19/00	1.482	1.607	1.691	1.684
	1.681	1.588	1.782	1.759
STUDY DAY	1.533	1.717	1.749	1.696
10	1.488	1.599	1.455	1.998
	1.422	1.599	1.841	1.824
STAGE	1.618	1.932	1.644	1.901
21	1.723	1.944	1.847	1.644
	1.400	1.863	1.877	1.868
	1.409	1.718	1.847	1.829
	1.481	1.707	1.699	1.664
	1.532	1.844	1.817	1.664
	1.357	1.535	1.909	1.610
	1.473	1.906	1.844	1.560
	1.374	1.588	1.651	1.627
	1.464	1.582	1.709	1.604
	1.473	1.427	1.913	1.726
	1.294	1.696	1.887	1.696
	1.651	1.996	1.588	1.770
	1.401	1.564	1.814	1.980
	1.202	1.814	1.835	1.697
	1.425	1.676	1.507	1.769
	1.452	1.604	1.782	
	1.427	1.774	1.789	

	•	•	•	
Individual Statisti	cs			
N	25	25	25	23
Mean	1.495	1.690	1.749	1.723
Var. (S ²)	0.024	0.026	0.018	0.018
SEM	0.031	0.032	0.027	0.028
Site Average				
Total N	98			
Site Mean	1.664			
Var. (S ²)	0.013			
SEM	0.058			

_	TP01-1	TP01-2	TP01-3	TP01-4
_				
	1.483	1.448	1.848	1.538
DATE	1.627	1.783	1.581	1.634
05/26/00	1.496	1.913	2.017	1.852
	1.797	1.550	1.829	1.808
STUDY DAY	1.766	1.621	1.597	1.624
17	1.574	1.657	1.562	1.658
	1.740	1.730	1.527	1.792
STAGE	1.648	1.462	1.531	1.656
21	1.499	1.760	1.468	1.670
	1.333	1.670	1.514	1.531
	1.463	1.485	1.652	1.745
	1.703	1.703	1.564	1.760
	1.481	1.716	1.618	1.517
	1.367	1.786	1.390	1.521
	1.414	1.836	1.439	1.673
	1.594	1.696	1.452	1.685
	1.521	1.675	1.570	1.518
	1.516	1.581	1.582	1.766
	1.628	1.690	1.741	1.651
	1.680	1.608	1.531	1.668
		1.903		1.712
		1.735		1.769
		1.495		

Individual Stati	stics			
N	20	23	20	22
Mean	1.567	1.674	1.601	1.670
Var. (S ²)	0.017	0.017	0.024	0.010
SEM	0.029	0.027	0.034	0.021
Site Average				
Total N	85			
Site Mean	1.628			
Var. (S ²)	0.003			
SEM	0.027			

_	TP01-1	TP01-2	TP01-3	TP01-4
	1.707	1.869		1.995
DATE	1.813	1.697		1.646
05/31/00	1.697	1.905		2.002
	1.854	1.757		2.248
STUDY DAY	1.966	1.650		
22	1.982	1.654		
	1.850	2.050		
STAGE		1.696		
22		1.766		
		1.815		
		1.917		
		1.999		
		2.043		

Individual Statisti	cs			
N	7	13	0	4
Mean	1.839	1.832	na	1.973
Var. (S ²)	0.013	0.020	na	0.061
SEM	0.042	0.040	na	0.124
Site Average Total N Site Mean Var. (S ²) SEM	24 1.881 0.006 0.046			

RANA pipiens DEVELOPMENTAL STUDY 2000 GROWTH DATA (Length in cm) SITE 35 (W-6) (42.0 mg/kg Sediment PCB Concentration)

	TP01-1	TP01-2	TP01-3	TP01-4
	0.005	0.070		0.500
	2.235	2.273		2.508
DATE	2.271	2.543		2.686
06/13/00	2.457	2.061		2.914
	2.773	2.248		2.936
STUDY DAY	2.607	2.737		
35	3.168			

STAGE 22

Individual Statist				
		F	0	4
N	6	5	0	4
Mean	2.585	2.372	na	2.761
Var. (S ²)	0.123	0.071	na	0.041
SEM	0.143	0.119	na	0.101
Site Average				
Total N	15			
Site Mean	2.573			
Var. (S ²)	0.038			
SEM	0.112			

_	TP01-1	TP01-2	TP01-3	TP01-4
	5.346	3.604		3.834
DATE	3.769	5.565		3.778
07/05/00	4.546	4.473		5.116
	5.088	4.037		4.389
STUDY DAY	4.125	3.520		
57	4.594			
STAGE				
23				

Individual Ctatiati				
Individual Statisti N	cs 6	5	0	4
	-	-	-	
Mean	4.578	4.240	na	4.279
Var. (S ²)	0.342	0.694	na	0.387
SEM	0.239	0.372	na	0.311
Site Average				
Site Average				
Total N	15			
Site Mean	4.366			
Var. (S ²)	0.034			
SEM	0.107			

	TP01-1	TP01-2	TP01-3	TP01-4
	F 046	2.464		4 674
	5.046	3.464		4.674
DATE	3.566	4.000		4.249
08/08/00		4.830		3.648
		4.880		6.022
STUDY DAY		5.276		
91				
STAGE 27				

Individual Statisti	ics			
N	2	5	0	4
Mean	4.306	4.490	na	4.649
Var. (S ²)	1.095	0.545	na	1.016
SEM	0.740	0.330	na	0.504
Site Average				
Total N	11			
Site Mean	4.482			
Var. (S ²)	0.029			
SEM	0.099			

_	EM01-1	EM01-2	EM01-3	EM01-4	EM02-1	EM02-2	EM02-3	EM02-4
	1.023	1.144	0.990	1.005	0.881	0.970	0.819	0.794
DATE	0.977	1.018	1.085	1.020	0.871	0.894	0.863	0.834
04/19/00	1.067	1.026	1.017	1.085	0.942	0.922	0.889	0.894
	0.919	0.949	1.062	0.916	0.844	0.932	0.936	0.930
STUDY DAY	1.012	0.877	1.082	1.067	0.849	0.908	0.894	0.774
0	1.056	0.877	1.040	0.999	0.977	0.784	0.938	0.806
	1.036	0.894	1.000	1.026	0.854	0.849	0.860	0.898
STAGE	0.857	1.000	1.010	1.116	0.962	0.762	0.771	0.938
20	1.044	0.889	1.137	1.017	0.832	0.720	0.884	0.943
	0.881	0.983	0.871	1.071	0.808	0.808	0.809	1.113
	0.903	0.819	1.018	0.974	0.886	0.871	0.860	0.926
	1.027	1.010	1.115	1.017	0.845	0.943	0.927	0.938
	0.891	0.809	1.023	0.963	0.754	0.949	1.017	0.932
	0.985	1.055	1.036	1.008	0.918	0.891	0.671	0.877
	1.041	0.977	0.856	1.008	0.919	0.888	0.782	0.834
	1.005	1.005	0.945	0.994	0.806	0.977	0.867	0.881
	1.036	0.966	0.877	1.072	1.109	0.965	0.926	0.915
	0.922	0.956	0.948	1.126	0.961	0.784	0.876	0.877
	0.942	0.881	1.044	1.030	0.885	0.889	0.834	0.889
	0.845	0.908	1.083	1.063	0.871	0.862	1.010	0.784
	0.943	1.097	1.060	1.056	0.816	0.999	0.969	0.611
	0.838	1.012	0.975	1.067	0.795	0.903	0.816	0.849
	1.056	1.029	1.056	0.903	0.955	0.915	0.844	0.794
	1.066	1.057	0.992	0.926	0.851	0.785	0.779	0.877
	0.894	0.767	0.993	1.038	0.912	0.891	0.808	0.969
	0.971				0.871			
	0.999				0.966			
	0.870				0.771			
	0.870				0.816			
	0.919				0.983			
Individual Statistic	cs							
N	30	25	25	25	30	25	25	25
Mean	0.963	0.960	1.013	1.023	0.884	0.882	0.866	0.875
Var. (S ²)	0.006	0.009	0.005	0.003	0.006	0.005	0.006	0.008
SEM	0.014	0.018	0.014	0.011	0.014	0.015	0.016	0.018
EM01 Average				EM02 Average				
Total N	105			Total N	105			
Site Mean	0.990			Site Mean	0.877			
Var. (S ²) SEM	0.001 0.016			Var. (S²) SEM	0.000 0.004			
Site Average								
Total N	210							
Site Mean	0.933							
Var. (S ²)	0.006							
SEM	0.056							

_	EM01-1	EM01-2	EM01-3	EM01-4	EM02-1	EM02-2	EM02-3	EM02-4
	1.129	1.258	1.088	1.083	1.170	1.198	1.044	1.217
DATE	1.222	1.191	1.223	1.059	1.140	1.334	1.118	1.116
04/25/00	1.191	1.154	0.922	1.199	0.965	1.279	1.154	1.097
	1.248	1.143	0.971	1.177	1.154	1.318	1.082	1.295
STUDY DAY	1.242	1.181	1.036	1.133	1.045	1.285	1.232	1.289
6	1.228	1.166	1.226	1.295	0.969	1.204	1.308	1.123
	1.203	1.263	1.243	1.183	1.140	1.158	1.315	1.126
STAGE	1.236	1.036	1.194	1.294	1.166	1.186	1.201	1.272
21	1.246	1.154	1.146	1.200	1.154	1.213	1.346	1.273
	1.170	1.181	1.166	1.327	1.185	1.305	0.984	1.285
	1.094	1.304	1.276	1.315	1.132	1.265	1.167	1.023
	1.204	1.232	1.240	1.243	1.023	1.220	1.211	1.129
	1.223	1.279	1.170	1.277	1.088	1.211	1.027	1.070
	1.118	1.218	1.120	1.213	1.113	1.164	1.156	1.137
	1.228	1.180	1.149	1.316	0.961	1.115	1.204	1.093
	1.159	1.093	1.204	1.352	1.246	1.180	1.129	1.090
	1.044	1.151	1.327	1.187	1.057	1.094	1.144	0.984
	1.137	1.378	1.223	1.279	1.116	1.057	1.154	1.137
	1.063	1.140	1.236	1.140	1.178	1.211	1.094	1.248
	1.114	1.185	1.017	1.232	1.204	1.088	0.969	0.969
	1.101	1.223	1.239	1.183	0.936	1.148	1.165	1.193
	1.222	1.295	1.137	1.304	1.132	1.010	1.256	1.254
	1.158	1.319	1.246	1.336	1.221	1.056	1.154	1.231
	1.265		1.177	1.201	1.157	1.141	1.085	1.170
	1.052			1.113	1.085	1.315	1.194	1.133
	1.211				1.137	1.010		1.100
	1.181				1.137			
	1.161				1.273			
	1.151				1.200			
					1.183			
Individual Statistic	cs							
N	29	23	24	25	30	25	25	25
Mean	1.172	1.205	1.166	1.226	1.122	1.190	1.156	1.158
Var. (S ²)	0.004	0.006	0.010	0.007	0.007	0.008	0.009	0.009
SEM	0.012	0.016	0.020	0.016	0.016	0.018	0.019	0.019
EM01 Average	46.1			EM02 Average	46-			
Total N	101			Total N	105			
Site Mean	1.192			Site Mean	1.157			
Var. (S ²) SEM	0.001 0.014			Var. (S²) SEM	0.001 0.014			
Site Average								
Total N	206							
Site Mean	1.174							
Var. (S ²)	0.001							
SEM	0.018							

_	EM01-1	EM01-2	EM01-3	EM01-4	EM02-1	EM02-2	EM02-3	EM02-4
DATE 05/02/00 STUDY DAY 13 STAGE 22	1.423 1.201 1.191 1.238 1.314 1.257 1.443 1.521 1.347 1.338 1.480 1.213 1.312 1.106 1.348 1.401	1.201 1.555 1.692 1.495 1.515 1.518 1.592 1.676	1.509 1.250 1.662 1.246	1.401 1.232 1.340 1.532 1.267 1.255 1.411 1.305 1.353 1.519 1.461 1.392 1.414 1.449 1.522 1.407	1.353 1.314 1.100 1.286 1.052 1.220 1.239 1.347 1.428 1.193 1.085 1.418 1.211 1.250 1.219 1.343	1.327 1.151 1.174 1.091 1.136 1.186 1.159 1.401 1.244 1.078 1.281 1.190 1.281 1.278 1.302 1.327	1.174 1.159 1.215 1.271 1.181 1.227 1.246 1.415 1.353 1.262 1.433 1.170 1.122 1.163 1.216 1.296	1.366 1.327 1.482 1.517 1.248 1.457 1.494 1.186 1.316 1.248 1.132 1.186 1.270 1.288 1.234 1.170
	1.548 1.332 1.322			1.215 1.540 1.361	1.106 1.278 1.253 1.184 1.144 1.347 1.146 1.381 1.227 1.230 1.133 1.359 1.268 1.453	1.453 1.458 1.254 1.551 1.334 1.458 1.333 1.302 1.354	1.281 1.301 1.352 1.363 1.331 1.397 1.369 1.392 1.316	1.359 1.336 1.246 1.387 1.412 1.363 1.254 1.281
Individual Statistic N Mean Var. (S ²) SEM	19 1.333 0.014 0.027	8 1.530 0.023 0.054	4 1.417 0.042 0.102	19 1.388 0.010 0.023	30 1.252 0.011 0.020	25 1.284 0.015 0.024	25 1.280 0.008 0.018	24 1.315 0.011 0.022
EM01 Average Total N Site Mean Var. (S²) SEM	50 1.417 0.007 0.042			EM02 Average Total N Site Mean Var. (S ²) SEM	104 1.283 0.001 0.013			
Site Average Total N Site Mean Var. (S ²) SEM	154 1.350 0.009 0.067							

-	EM01-1	EM01-2	EM01-3	EM01-4	EM02-1	EM02-2	EM02-3	EM02-4
DATE	1.481 1.379	1.559 1.505	1.456 1.737	1.554 1.468		1.450 1.399	1.448 1.370	1.560 1.540
05/08/00	1.276	1.676	1.875	1.423		1.546	1.370	1.166
00/00/00	1.436	1.653	1.075	1.480		1.275	1.599	1.342
STUDY DAY	1.353	1.554		1.545		1.408	1.556	1.478
19	1.269	1.537		1.468		1.439	1.331	1.414
10	1.256	1.609		1.504		1.368	1.381	1.439
STAGE		1.009				1.352	1.365	
23	1.320			1.445				1.426
23	1.195			1.447		1.291	1.384	1.614
	1.351			1.602		1.320	1.351	1.137
	1.245			1.607		1.521	1.501	1.287
	1.252			1.389		1.275	1.481	1.305
	1.481			1.455		1.107	1.258	1.486
	1.302					1.329	1.297	1.381
	1.186					1.379	1.270	1.373
	1.355					1.320	1.336	1.217
						1.329	1.502	1.329
						1.326	1.443	1.393
						1.456	1.329	1.467
						1.324	1.400	1.340
						1.297	1.283	1.381
						1.378	1.430	
						1.390	1.285	
						1.398	00	
						1.399		
						1.000		
Individual Statistic	cs 16	7	3	13	0	25	23	21
Mean	1.321	1.585	1.689	1.491	na	1.363	1.389	1.385
Var. (S ²)	0.008	0.004	0.046	0.005	na	0.008	0.009	0.015
SEM	0.023	0.024	0.123	0.019	na	0.018	0.019	0.027
EM01 Average				EM02 Average				
Total N	39			Total N	69			
Site Mean	1.522			Site Mean	1.379			
Var. (S ²) SEM	0.024 0.078			Var. (S ²) SEM	0.000 0.008			
Site Average	-							
Total N	108							
Site Mean	1.450							
Var. (S ²)	0.010							
SEM	0.071							

<u>-</u>	EM01-1	EM01-2	EM01-3	EM01-4	EM02-1	EM02-2	EM02-3	EM02-4
	2.112	2.400	2.896	2.536		1.625	2.121	1.782
DATE		1.829	3.098			1.754	2.189	1.581
05/19/00		1.888	2.386			2.049	1.880	1.749
		2.134					1.996	2.179
STUDY DAY		2.514					2.211	2.056
30		2.828					2.064	1.651
								1.091
STAGE								1.542
24								1.889
								1.980
								2.279

Individual Statistic	cs							
N	1	6	3	1	0	3	6	11
Mean	2.112	2.266	2.793	2.536	na	1.809	2.077	1.798
Var. (S ²)	na	0.149	0.135	na	na	0.047	0.016	0.112
SEM	na	0.158	0.212	na	na	0.126	0.051	0.101
EM01 Average				EM02 Average				
Total N	11			Total N	20			
Site Mean	2.427			Site Mean	1.895			
Var. (S ²)	0.090			Var. (S ²)	0.025			
SEM	0.150			SEM	0.091			
Site Average								
Total N	31							
Site Mean	2.161							
Var. (S ²)	0.142							
SEM	0.266							

-	EM01-1	EM01-2	EM01-3	EM01-4	EM02-1	EM02-2	EM02-3	EM02-4
	2.391	2.668	2.994	3.282		2.193	1.845	1.597
DATE		1.745	3.304			2.107	1.789	1.712
05/26/00		1.638	2.369				1.815	1.516
		2.093					2.300	1.775
STUDY DAY		2.011					2.453	1.272
37		2.276					2.066	1.636
								1.798
STAGE								1.391
24								2.052

ndividual Statistic	CS .	_	_		_	_	_	_
N	1	6	3	1	0	2	6	9
Mean	2.391	2.072	2.889	3.282	na	2.150	2.045	1.639
Var. (S ²)	na	0.139	0.227	na	na	0.004	0.078	0.054
SEM	na	0.152	0.275	na	na	0.043	0.114	0.078
EM01 Average				EM02 Average				
Total N	11			Total N	17			
Site Mean	2.659			Site Mean	1.944			
Var. (S ²)	0.286			Var. (S ²)	0.073			
SEM	0.267			SEM	0.156			
Site Average								
Total N	28							
Site Mean	2.301							
Var. (S ²)	0.255							
SEM	0.357							

-	EM01-1	EM01-2	EM01-3	EM01-4	EM02-1	EM02-2	EM02-3	EM02-4
	2.857	2.618	3.099	3.826		2.059	2.261	1.531
DATE		2.173	3.125			2.636	2.734	1.842
05/31/00		2.290	2.448				1.904	2.316
		2.263					1.861	2.104
STUDY DAY		1.815					2.027	
42		1.940					1.811	
STAGE								
24								

ndividual Statistic	cs							
N	1	6	3	1	0	2	6	4
Mean	2.857	2.183	2.891	3.826	na	2.347	2.100	1.948
Var. (S ²)	na	0.080	0.147	na	na	0.166	0.123	0.115
SEM	na	0.116	0.221	na	na	0.288	0.143	0.169
EM01 Average				EM02 Average				
Total N	11			Total N	12			
Site Mean	2.939			Site Mean	2.132			
Var. (S ²)	0.456			Var. (S ²)	0.041			
SEM	0.338			SEM	0.116			
Site Average								
Total N	23							
Site Mean	2.536							
Var. (S ²)	0.326							
SEM	0.404							

	EM01-1	EM01-2	EM01-3	EM01-4	EM02-1	EM02-2	EM02-3	EM02-4
	3.565	2.446	3.817	5.200		3.330	2.966	2.802
DATE		2.399				2.697	3.207	2.432
06/13/00		1.989					2.660	2.667
		3.025						
STUDY DAY		2.608						
55								
STAGE 26								

ndividual Statistic	cs							
N	1	5	1	1	0	2	3	3
Mean	3.565	2.493	3.817	5.200	na	3.014	2.944	2.634
Var. (S²)	na	0.140	na	na	na	0.200	0.075	0.035
SEM	na	0.168	na	na	na	0.317	0.158	0.108
EM01 Average				EM02 Average				
Total N	8			Total N	8			
Site Mean	3.769			Site Mean	2.864			
Var. (S ²)	1.239			Var. (S ²)	0.041			
SEM	0.557			SEM	0.117			
Site Average								
Total N	16							
Site Mean	3.316							
Var. (S ²)	0.410							
SEM	0.453							

_	EM01-1	EM01-2	EM01-3	EM01-4	EM02-1	EM02-2	EM02-3	EM02-4
	4.488	4.695	6.130	7.484		3.283	4.131	3.816
DATE		3.780				5.632	3.411	3.951
07/05/00		4.671					3.838	3.371
		5.176						
STUDY DAY		2.836						
77								
STAGE 28								

Individual Statistic	cs							
N	1	5	1	1	0	2	3	3
Mean	4.488	4.232	6.130	7.484	na	4.457	3.793	3.713
Var. (S ²)	na	0.863	na	na	na	2.761	0.131	0.092
SEM	na	0.416	na	na	na	1.175	0.209	0.175
EM01 Average				EM02 Average				
Total N	8			Total N	8			
Site Mean	5.583			Site Mean	3.988			
Var. (S ²)	2.312			Var. (S ²)	0.167			
SEM	0.760			SEM	0.236			
Site Average								
Total N	16							
Site Mean	4.786							
Var. (S ²)	1.273							
SEM	0.798							

_	EM01-1	EM01-2	EM01-3	EM01-4	EM02-1	EM02-2	EM02-3	EM02-4
	2.349	3.677	6.540			6.433	3.799	3.400
DATE		5.094				3.596	5.032	4.697
08/08/00		4.962					4.943	3.996
		5.102						
STUDY DAY		3.824						
111								
STAGE 37								

Individual Statistic	cs							
N	1	5	1	0	0	2	3	3
Mean	2.349	4.532	6.540	na	na	5.015	4.591	4.031
Var. (S ²)	na	0.514	na	na	na	4.026	0.472	0.422
SEM	na	0.321	na	na	na	1.419	0.397	0.375
EM01 Average				EM02 Average				
Total N	7			Total N	8			
Site Mean	4.473			Site Mean	4.546			
Var. (S ²)	4.393			Var. (S ²)	0.243			
SEM	1.210			SEM	0.285			
Site Average								
Total N	15							
Site Mean	4.510							
Var. (S ²)	0.003							
SEM	0.036							

	TP01-1	TP01-2	TP01-3	TP01-4
	4.450			
	1.459			
DATE	1.236			
05/09/00	1.181			
	1.601			
STUDY DAY	1.649			
0	1.514			
	1.568			
STAGE	1.294			
20	1.618			
	1.571			

Individual Statist	ics			
N	10	0	0	0
Mean	1.469	na	na	na
Var. (S ²)	0.029	na	na	na
SEM	0.054	na	na	na

	TP01-1	TP01-2	TP01-3	TP01-4
	0.400			
	2.123			
DATE	1.676			
05/19/00	1.985			
	1.543			
STUDY DAY	1.815			
10	2.162			
	1.668			
STAGE	1.929			
21	1.994			

Individual Statist	ics			
N	9	0	0	0
Mean	1.877	na	na	na
Var. (S ²)	0.046	na	na	na
SEM	0.072	na	na	na

_	TP01-1	TP01-2	TP01-3	TP01-4
	2.027			
DATE	1.750			
05/26/00	2.149			
	2.160			
STUDY DAY	1.582			
17	2.092			
	2.011			
STAGE	1.880			
21				

-						
Individual Statistics						
N	8	0	0	0		
Mean	1.956	na	na	na		
Var. (S ²)	0.042	na	na	na		
SEM	0.072	na	na	na		

	TP01-1	TP01-2	TP01-3	TP01-4
	1.912			
DATE	1.941			
05/31/00	2.247			
STUDY DAY				
22				
STAGE				
22				

-					
Individual Statistics					
N	3	0	0	0	
Mean	2.033	na	na	na	
Var. (S ²)	0.034	na	na	na	
SEM	0.107	na	na	na	

-	EM01-1	EM01-2	EM01-3	EM01-4
DATE 04/25/00 STUDY DAY 0 STAGE 21	0.854 0.851 0.949 0.862 0.795 0.974 0.834 0.849 0.895 0.809 0.930 0.894 0.991 0.930 0.864 0.845 0.993 0.915 0.771 0.943 0.893 0.819 0.833 0.819 0.910 0.870 0.836 0.716 0.916 0.938	0.808 0.595 0.777 0.922 0.943 0.916 0.895 0.922 1.010 0.984 0.958 0.963 0.963 0.963 0.954 0.881 0.912 0.972 0.917 1.005 0.970 0.956 0.908 0.812 0.910 0.732	0.793 0.781 0.871 0.709 0.711 0.954 0.975 0.963 0.888 0.881 0.936 0.888 0.900 0.893 1.030 0.908 0.945 0.881 0.990 1.000 0.949 0.916 0.758 0.767 0.864	0.949 0.985 0.916 0.932 0.936 0.915 0.777 0.842 0.996 0.906 0.923 0.936 0.969 0.975 0.971 1.036 0.927 1.077 0.945 0.896 0.984 0.908 0.860 1.032 1.036
Individual Statisti N Mean Var. (S²) SEM	30 0.878 0.004 0.012	25 0.903 0.009 0.019	25 0.886 0.008 0.018	25 0.945 0.004 0.013
Site Average Total N Site Mean Var. (S ²) SEM	105 0.903 0.001 0.015			

	EM01-1	EM01-2	EM01-3	EM01-4
DATE 05/02/00 STUDY DAY 7 STAGE 22	1.271 1.271 1.365 1.330 1.423 1.290 1.290 1.402 1.348 1.467 1.369 1.330 1.244 1.347 1.296 1.418 1.338 1.248 1.306 1.355 1.314 1.418 1.294 1.397 1.231 1.222 1.267 1.480	1.434 1.222 1.182 1.237 1.242 1.294 1.271 1.288 1.326 1.396 1.275 1.458 1.049 1.362 1.363 1.509 1.444 1.418 1.365 1.373 1.348 1.471 1.391 1.423 1.458	1.497 1.281 1.386 1.331 1.398 1.482 1.578 1.401 1.484 1.432 1.471 1.363 1.232 1.523 1.410 1.435 1.501 1.444 1.265 1.255 1.304 1.301 1.298 1.544 1.316	1.440 1.280 1.413 1.459 1.369 1.518 1.473 1.429 1.531 1.432 1.431 1.425 1.377 1.406 1.368 1.466 1.426 1.511 1.467 1.477 1.340 1.262 1.334 1.391
	1.294 1.181			
Individual Statist N Mean Var. (S ²) SEM	30 1.327 0.005 0.013	25 1.344 0.011 0.021	25 1.397 0.010 0.020	25 1.418 0.005 0.014
Site Average Total N Site Mean Var. (S²) SEM	105 1.372 0.002 0.022			

_	EM01-1	EM01-2	EM01-3	EM01-4
DATE 05/08/00 STUDY DAY 13 STAGE 22	1.300 1.241 1.312 1.476 1.325 1.279 1.476 1.275 1.450 1.526 1.408 1.198 1.391 1.300 1.432 1.290 1.389 1.325 1.304 1.355 1.287 1.480 1.414 1.298 1.160 1.273 1.297 1.355 1.287 1.355 1.287 1.331	1.150 1.319 1.431 1.399 1.355 1.277 1.483 1.287 1.331 1.315 1.305 1.381 1.125 1.266 1.129 1.398 1.450 1.445 1.393 1.369 1.160 1.188 1.423 1.420 1.316	1.226 1.293 1.420 1.202 1.465 1.283 1.297 1.273 1.180 1.279 1.447 1.456 1.439 1.425 1.297 1.254 1.399	1.250 1.377 1.439 1.304 1.377 1.383 1.241 1.308 1.316 1.312 1.353 1.310 1.423 1.526 1.135
Individual Statistic N Mean Var. (S ²) SEM	30 1.341 0.008 0.016	25 1.325 0.011 0.021	17 1.332 0.009 0.023	15 1.337 0.009 0.024
Site Average Total N Site Mean Var. (S ²) SEM	87 1.334 0.000 0.004			

_	EM01-1	EM01-2	EM01-3	EM01-4
	2.541		2 520	0.430
			2.520	2.138
DATE	1.804			2.197
05/19/00	2.163			1.443
	1.818			1.670
STUDY DAY	1.718			1.885
24				1.738
				1.856
STAGE				2.045
23				1.988
				2.081
				1.707
				1.878

Individual Statist	ios			
N	5	0	1	12
	-	U	•	· -
Mean	2.009	na	2.520	1.885
Var. (S ²)	0.117	na	na	0.048
SEM	0.153	na	na	0.063
Site Average Total N Site Mean Var. (S ²) SEM	18 2.138 0.113 0.194			

_	EM01-1	EM01-2	EM01-3	EM01-4
	1.561		3.802	1.833
DATE	1.664			1.928
05/26/00	2.099			1.893
	1.923			1.669
STUDY DAY				1.799
31				1.906
				1.826
STAGE				1.631
23				1.736
				1.965
				2.172
				1.960

ndividual Statist	ics			
N	4	0	1	12
Mean	1.812	na	3.802	1.860
Var. (S ²)	0.060	na	na	0.021
SEM	0.122	na	na	0.042
Site Average				
Total N	17			
Site Mean	2.491			
Var. (S ²)	1.289			
SEM	0.655			

_	EM01-1	EM01-2	EM01-3	EM01-4
	4.570		0.070	4.705
	1.579		3.978	1.725
DATE	2.058			2.013
05/31/00	1.709			1.884
	1.943			1.886
STUDY DAY				1.985
36				1.766
				1.691
STAGE				1.541
24				1.872
				1.805
				2.062

ndividual Statisti	ce			
N	4	0	1	11
Mean	1.822	na	3.978	1.839
Var. (S ²)	0.047	na	na	0.024
SEM	0.109	na	na	0.046
Site Average				
Total N	16			
Site Mean	2.546			
Var. (S ²)	1.537			
SEM	0.716			

_	EM01-1	EM01-2	EM01-3	EM01-4
	3.087		4.717	2.499
DATE	2.481			2.216
06/13/00	2.686			2.444
	1.789			1.941
STUDY DAY				2.236
49				2.739
				2.325
STAGE				2.043
25				2.125
				2.479
				2.583

Individual Statisti	cs			
N	4	0	1	11
Mean	2.511	na	4.717	2.330
Var. (S ²)	0.295	na	na	0.059
SEM	0.271	na	na	0.073
Site Average				
Total N	16			
Site Mean	3.186			
Var. (S ²)	1.767			
SEM	0.767			

_	EM01-1	EM01-2	EM01-3	EM01-4
	5.050			0.004
	5.856			3.024
DATE	3.313			2.371
07/05/00	3.235			2.564
	2.359			2.570
STUDY DAY				3.217
71				2.814
				2.841
STAGE				3.767
27				3.584
				3.406
				3.748

Individual Statisti	cs			
N	4	0	0	11
Mean	3.691	na	na	3.082
Var. (S ²)	2.271	na	na	0.246
SEM	0.753	na	na	0.149
Site Average				
Total N	15			
Site Mean	3.387			
Var. (S ²)	0.185			
SEM	0.304			

	EM01-1	EM01-2	EM01-3	EM01-4
	0.055			1 101
	6.055			4.191
DATE	3.662			3.186
08/08/00	3.145			2.987
	3.642			2.876
STUDY DAY				4.286
105				3.174
				3.578
STAGE				4.733
40				3.495
				3.835

Individual Statist	ics			
N	4	0	0	10
Mean	4.126	na	na	3.634
Var. (S²)	1.711	na	na	0.379
SEM	0.654	na	na	0.195
Site Average Total N Site Mean Var. (S ²) SEM	14 3.880 0.121 0.246			

RANA pipiens DEVELOPMENTAL STUDY 2000 GROWTH DATA (Length in cm)

R3 (External Reference) LARVAE IN REFERENCE SITE 40 (MP) (0.04 mg/kg Sediment PCB Concentration) (Larvae maintained in FETAX solution until Site MP water was received on May 30, 2000)

_	EM01-1	EM01-2	EM01-3	EM01-4	EM02-1	EM02-2	EM02-3	EM02-4
	4.004	4.400	4.050	4.004	4.000	4.400	4 000	4.000
	1.061	1.102	1.058	1.031	1.003	1.163	1.206	1.099
DATE	1.003	0.982	1.046	0.911	1.048	1.041	1.089	0.937
05/24/00	0.957	0.934	0.959	1.006	0.982	0.955	1.116	0.888
	1.041	1.007	1.170	0.669	0.945	1.101	1.102	1.037
STUDY DAY	0.896	0.934	1.061	0.972	0.967	1.058	1.187	1.011
0	1.002	1.028	1.111	1.007	1.019	1.050	1.024	1.025
	1.118	1.038	1.069	0.959	0.928	0.923	1.033	1.047
STAGE	0.832	0.982	1.139	0.917	1.047	1.047	1.046	0.872
20	0.950	0.979	1.093	0.982	1.040	0.845	0.834	1.006
	1.007	1.034	0.923	0.950	1.159	0.982	1.019	1.025
	0.986	0.958	1.010	0.944	1.072	0.925	1.033	0.943
	1.133	0.780	1.028	1.072	1.007	1.037	0.970	1.080
	1.002	1.096	1.021	1.081	1.046	1.117	1.022	0.865
	1.047	0.996	1.072	1.093	1.031	1.010	0.917	1.061
	0.937	0.806	1.011	1.096	1.047	1.195	0.923	0.972
	1.131	0.862	1.131	1.014	1.117	1.125	1.112	1.065
	1.093	1.059	1.007	1.028	1.010	0.982	0.959	0.979
	1.193	1.044	1.041	1.033	1.011	1.022	1.024	1.308
	1.087	0.972	1.155	0.985	1.031	1.140	1.046	1.028
	1.096	0.907	0.727	0.975	1.028	1.072	0.976	1.080

N	20	20	20	20	20	20	20	20
Mean	1.029	0.975	1.042	0.986	1.027	1.039	1.032	1.016
Var. (S ²)	0.008	0.007	0.009	0.009	0.003	0.008	0.008	0.010
SEM	0.020	0.019	0.022	0.021	0.012	0.020	0.020	0.022
EM01 Average				EM02 Average				
Total N	80			Total N	80			
Site Mean	1.008			Site Mean	1.029			
Var. (S ²)	0.001			Var. (S ²)	0.000			
SEM	0.016			SEM	0.005			
Site Average								
Total N	160							
Site Mean	1.018							
Var. (S ²)	0.000							
SEM [′]	0.010							

RANA pipiens DEVELOPMENTAL STUDY 2000 GROWTH DATA (Length in cm)

R3 (External Reference) LARVAE IN REFERENCE SITE 40 (MP) (0.04 mg/kg Sediment PCB Concentration) (Larvae maintained in FETAX solution until Site MP water was received on May 30, 2000)

<u></u>	EM01-1	EM01-2	EM01-3	EM01-4	EM02-1	EM02-2	EM02-3	EM02-4
	4.047	4 470	4.544	4 004	0.440	4 200	4.005	4.550
	1.247	1.478	1.514	1.621	2.140	1.399	1.605	1.556
DATE	1.354	1.438	1.328	1.258	1.735	1.373	1.529	1.468
05/31/00	1.185	1.436	1.489	1.363	1.690	1.380	1.575	1.486
	1.504	1.270	1.538	1.457	1.351	1.463	1.525	1.382
STUDY DAY	1.634	1.439	1.533	1.542	1.540	1.418	1.553	1.350
7	1.735	1.595	1.643	1.351	1.501	1.468	1.547	1.538
	1.866	1.456	1.675	1.379	1.488	1.360	1.586	1.645
STAGE	1.189	1.659	1.521	1.664	1.486	1.281	1.616	1.612
23	1.095	1.548	1.621	1.721	1.856	1.358	1.522	1.462
	1.378	1.496	1.646	1.581	1.496	1.389	1.693	1.607
	1.282	1.368	1.420	1.621	1.455	1.410	1.370	1.368
	1.515	1.325	1.247	1.547	1.517	1.537	1.595	1.190
	1.393	1.344	1.451	1.581	1.470	1.596	1.462	1.559
	1.351	1.522	1.498	1.498	1.622	1.373	1.546	1.547
	1.382	1.460	1.364	1.486	1.384	1.357	1.746	1.635
	1.337	1.372	1.506	1.701	1.585	1.330	1.245	1.525
	1.448	1.325	1.304	1.572		1.582	1.542	1.521
	1.475	1.154				1.422		1.594
	1.525							1.404
	1.529							

N	20	18	17	17	16	18	17	19
Mean	1.421	1.427	1.488	1.526	1.582	1.416	1.545	1.497
Var. (S ²)	0.035	0.015	0.015	0.017	0.039	0.007	0.013	0.014
SEM	0.042	0.029	0.030	0.032	0.049	0.020	0.027	0.027
EM01 Average				EM02 Average				
Total N	72			Total N	70			
Site Mean	1.466			Site Mean	1.510			
Var. (S ²)	0.003			Var. (S ²)	0.005			
SEM	0.025			SEM	0.036			
Site Average								
Total N	142							
Site Mean	1.488							
Var. (S ²)	0.001							
SEM	0.022							

RANA pipiens DEVELOPMENTAL STUDY 2000 GROWTH DATA (Length in cm)

_	EM01-1	EM01-2	EM01-3	EM01-4	EM02-1	EM02-2	EM02-3	EM02-4
								_
	1.869	2.356	2.414	2.327	2.361	2.351	2.205	2.502
DATE	2.113	2.038	2.671	2.274	2.636	2.283	2.791	2.594
06/13/00	2.274	2.381	2.197	2.165	2.501	2.613	2.712	2.655
	2.100	2.186	2.371	2.287	2.660	2.472	2.812	3.117
STUDY DAY	2.227	2.360	2.404	2.469	2.542	2.434	2.509	2.400
20	2.287	2.339	2.954	2.670	2.517	2.735	2.192	2.347
	2.110	2.388	1.868	2.098	2.465	1.972	2.563	2.450
STAGE	2.238	1.996	2.142	2.367	2.659	2.238	2.450	2.222
25	2.215	1.998	1.823	2.194	2.360	2.256	2.297	2.182
	1.946	2.164	2.131	2.447	2.523	2.271	2.346	2.295
	2.290	2.246	2.186	2.367	2.232	2.555	2.492	2.212
	2.224	2.556	2.307	2.490	2.332	2.232	2.656	2.277
	1.980	2.408	2.351	1.968	2.596	2.367	2.550	2.133
	2.028	2.280	2.361	2.198	2.637	2.038	1.847	2.227
	2.150	2.239	2.384	1.674	2.592	2.153	1.913	1.946
	1.960	2.194	2.366	2.182		2.153	2.405	1.984
	1.864	2.473	2.014	2.257		2.612	2.273	2.053
	2.134					2.074		1.782
	2.112							2.200
	2.473							

N	20	17	17	17	15	18	17	19
Mean	2.130	2.271	2.291	2.261	2.507	2.323	2.413	2.294
Var. (S ²)	0.024	0.026	0.074	0.050	0.018	0.046	0.075	0.088
SEM	0.035	0.039	0.066	0.054	0.034	0.050	0.067	0.068
EM01 Average				EM02 Average				
Total N	71			Total N	69			
Site Mean	2.238			Site Mean	2.384			
Var. (S ²)	0.005			Var. (S ²)	0.009			
SEM	0.037			SEM	0.048			
Site Average								
Total N	140							
Site Mean	2.311							
Var. (S ²)	0.011							
SEM	0.073							

RANA pipiens DEVELOPMENTAL STUDY 2000 GROWTH DATA (Length in cm)

	EM01-1	EM01-2	EM01-3	EM01-4	EM02-1	EM02-2	EM02-3	EM02-4
	2.020	2.072	2 207	F 100	2.040	2.427	2.040	2.400
	3.920	3.273	3.207	5.102	2.818	3.427	3.048	3.489
DATE	3.189	4.271	3.148	3.373	2.982	3.887	3.218	3.224
07/05/00	4.199	3.393	2.812	3.349	3.699	3.976	2.879	3.248
	3.441	2.772	4.583	2.836	3.578	3.800	3.940	3.672
STUDY DAY	4.251	3.329	3.588	2.966	3.887	4.402	3.931	4.791
42	3.002	3.837	3.183	3.349	2.478	4.186	3.275	3.666
	3.670	4.664	3.645	3.950	3.021	4.081	3.866	3.513
STAGE	3.727	3.689	2.502	2.989	4.098	3.401	4.482	3.328
29	3.193	5.386	3.662	2.739	2.929	4.786	4.159	3.670
	4.274	3.573	2.905	2.736	2.488	3.658	4.526	3.949
	3.630	3.532	2.845	2.841	3.501	3.967	3.808	3.334
	2.516	3.373	3.687	3.587	2.950	3.541	3.586	3.974
	4.647	3.423	3.884	3.594	3.299	4.447	4.898	3.506
	3.607	4.237	2.752	3.942	3.643	3.351	4.548	4.343
	3.163	3.374	4.946	3.468	3.692	3.132	2.286	2.887
	4.796	3.010	3.130	4.196		3.550	3.395	2.904
	3.701		3.298			3.613	3.599	3.126
	3.409					4.362		3.412
	3.432							
	3.664							

ndividual Stati N	20	16	17	16	15	18	17	18
Mean	3.671	3.696	3.399	3.439	3.271	3.865	3.732	3.558
Var. (S ²)	0.313	0.433	0.414	0.403	0.252	0.201	0.464	0.230
SEM	0.125	0.164	0.156	0.159	0.130	0.106	0.165	0.113
EM01 Average				EM02 Average				
Total N	69			Total N	68			
Site Mean	3.551			Site Mean	3.606			
Var. (S ²)	0.024			Var. (S ²)	0.066			
SEM	0.077			SEM	0.128			
Site Average								
Total N	137							
Site Mean	3.579							
Var. (S ²)	0.002							
SEM	0.028							

RANA pipiens DEVELOPMENTAL STUDY 2000 GROWTH DATA (Length in cm)

	EM01-1	EM01-2	EM01-3	EM01-4	EM02-1	EM02-2	EM02-3	EM02-4
	3.324	4.054	2.979	3.792	3.890	5.081	4.285	5.115
DATE								
DATE	4.023	3.799	3.620	3.467	3.872	3.727	2.755	3.863
07/11/00	3.964	3.261	3.393	5.739	3.638	4.018	3.886	3.853
	3.116	3.359	3.691	3.473	4.373	4.079	3.585	3.487
STUDY DAY	4.295	3.266	5.058	3.413	3.259	3.523	2.760	3.819
48	4.386	3.855	4.501	3.484	3.362	3.961	4.641	3.769
	3.764	3.233	3.053	3.347	3.567	3.701	3.909	3.812
STAGE	4.509	4.204	3.179	3.228	3.028	3.675	4.713	3.447
30	3.732	3.981	3.235	3.675	2.299	4.748	3.886	3.357
	3.157	5.218	3.913	3.258	3.692	3.952	4.685	4.045
	3.054	3.701	3.519	3.239	3.306	3.902	4.025	4.276
	3.132	3.250	3.570	3.767	3.668	3.814	4.217	2.984
	4.747	3.947	3.805	3.705	4.439	3.635	5.647	3.490
	3.753	3.788	4.391	4.345	3.808	3.938	3.943	5.165
	3.525	5.674	2.833	3.949	3.658	4.363	2.264	3.862
	3.559	3.628	3.285	3.826		3.663	3.543	3.260
	4.802		3.836			4.181	4.132	3.684
	5.167					3.575		3.658
	3.314							
	3.362							

ndividual Stati N	20	16	17	16	15	18	17	18
Mean	3.834	3.889	3.639	3.732	3.591	3.974	3.934	3.830
Var. (S ²)	0.400	0.475	0.342	0.376	0.271	0.168	0.669	0.317
SEM	0.141	0.172	0.142	0.153	0.135	0.097	0.198	0.133
EM01 Average				EM02 Average				
Total N	69			Total N	68			
Site Mean	3.773			Site Mean	3.832			
Var. (S ²)	0.012			Var. (S ²)	0.030			
SEM	0.055			SEM	0.086			
Site Average								
Total N	137							
Site Mean	3.803							
Var. (S ²)	0.002							
SEM	0.029							

RANA pipiens DEVELOPMENTAL STUDY 2000 GROWTH DATA (Length in cm)

_	EM01-1	EM01-2	EM01-3	EM01-4	EM02-1	EM02-2	EM02-3	EM02-4
	4.749	4.107	5.539	4.061	3.815	4.173	4.502	4.932
DATE	3.323	5.180	3.440	4.210	3.682	3.831	5.523	4.986
08/08/00	3.052	4.687	3.657	4.109	4.326	4.644	4.233	5.690
	4.007	4.742	4.868	5.411	3.246	4.672	2.739	3.775
STUDY DAY	5.520	4.600	4.043	3.673	3.583	5.941	4.343	3.208
76	5.334	4.324	3.736	4.493	3.385	4.025	5.068	4.293
	4.297	4.055	4.657	4.102	4.772	4.683	5.171	3.783
STAGE	5.273	5.301	3.286	3.058	5.046	3.881	6.426	4.327
38	3.311	3.263	4.528	3.179	4.142	4.214	5.343	4.028
	5.034	5.186	4.135	3.761	4.074	4.517	4.028	4.217
	3.832	6.018	3.840	3.129	3.608	3.728	3.370	4.278
	4.638	3.823	4.940	3.687	2.859	5.727	4.102	4.072
	4.327	4.786	3.887	3.695	3.240	2.836	4.041	3.595
		4.510	3.645	5.280	3.245	4.672	4.125	4.862
		5.055	5.471	5.081	3.836	4.350	5.656	4.989
				4.541		4.298	5.277	3.773
						4.102		4.517
						4.124		

ndividual Stati	istics							
N	13	15	15	16	15	18	16	17
Mean	4.361	4.642	4.245	4.092	na	4.357	4.622	4.313
Var. (S ²)	0.676	0.460	0.512	0.530	0.361	0.488	0.876	0.393
SEM	0.228	0.175	0.185	0.182	0.155	0.165	0.234	0.152
EM01 Average				EM02 Average				
Total N	59			Total N	66			
Site Mean	4.335			Site Mean	4.430			
Var. (S ²)	0.054			Var. (S ²)	0.028			
SEM	0.116			SEM	0.096			
Site Average								
Total N	125							
Site Mean	4.383							
Var. (S ²)	0.005							
SEM	0.048							

Crossover Study

Raw Data:

Mortality/Metamorphosis
Larval Stage/Malformations
Larval Growth
Hypothesis Testing Tables

HOUSATONIC RIVER PROJECT CROSSOVER *RANA pipiens* DEVELOPMENTAL STUDY 2000 MORTALITY/METAMORPH DATA SUMMARY

	Mon	tality	Metar	norph	
DAY	%	SEM	%	SEM	N
					39
0	0.00	0.00	0.00	0.00	
10	0.00	0.00	0.00	0.00	
17	5.56	5.56	0.00	0.00	
22	13.61	10.54	0.00	0.00	
35	31.11	5.03	0.00	0.00	
57	31.11	5.03	0.00	0.00	
63	31.11	5.03	0.00	0.00	
91	48.89	6.62	2.50	2.50	
108	54.17	5.83	5.28	3.06	
128	56.67	4.08	5.28	3.06	
Cumulative	56.67	4.08	5.28	3.06	

R3 Ref. Larvae in Site W-8 (120.0 mg/Kg Sed. PCB) Reps=4, 113 Days*											
	Mort	ality	Metar	morph							
DAY	%	SEM	%	SEM	N						
					80						
0	0.00	0.00	0.00	0.00							
7	6.25	2.39	0.00	0.00							
20	10.00	2.04	0.00	0.00							
42	12.50	3.23	0.00	0.00							
48	12.50	3.23	0.00	0.00							
76	12.50	3.23	0.00	0.00							
84	12.50	3.23	0.00	0.00							
96	16.25	5.54	7.50	1.44							
105	20.00	7.91	8.75	1.25							
113	32.50	4.33	8.75	1.25							
Cumulative	32.50	4.33	8.75	1.25							

	R3 Ref. Larva	e in Ref. Site MP (0.04 r		=8, 113 Days* morph	
DAY	%	SEM	%	SEM	N
					160
0	0.00	0.00	0.00	0.00	
7	11.25	1.25	0.00	0.00	
20	12.50	1.25	0.00	0.00	
42	14.38	0.63	0.00	0.00	
48	14.38	0.63	0.00	0.00	
76	21.88	4.38	0.00	0.00	
84	22.50	5.00	2.50	0.00	
96	25.00	3.75	5.63	1.88	
113	43.75	1.25	5.63	1.88	
Cumulative	43.75	1.25	5.63	1.88	

Metamorph Data Summary of Additional R3 Specimens										
R3 in Dechlorinated Tap Water, Reps=4										
	Metamorph									
	% SEM N									
			160							
Cumulative	62.50	6.69								

^{*}Test Duration.

HOUSATONIC RIVER PROJECT CROSSOVER RANA pipiens DEVELOPMENTAL STUDY 2000 MORTALITY/METAMORPH DATA R1 REFERENCE LARVAE IN SITE 33 (W-8) WATER/SEDIMENT, 120.0 mg/Kg SEDIMENT PCB

				M01-1				101-2			EM01-3					EM01-4			1	CUMULATIVE	1	CUMULA	
DATE DAY		DEAD	CUMUL	CUMUL. % % METAM. DEAD META		NO. CUMUL. DEAD DEAD	CUMUL.	CUMUL. % % METAM. DEAD METAM.	NO. DEAD	CUMUL. DEAD	CUMUL. LIVE	CUMUL. % METAM. DEAD ME		NO. DEAD	CUMUL. DEAD	CUMUL. LIVE	CUMUL.			RTALITY STATISTICS VAR (S2) SEM CV (%)			STATISTICS SEM CV (%)
											LIVE												
5/9/2000 0 5/11/2000 2	0	0	10	0.00 0.0 0.00 0.0		0 0	10 10	0.00 0.00 0.00 0.00	0	0	9		0.00	0	0	10 10		0.00 0.00 0.00 0.00	0.00	0.00 0.00 na 0.00 0.00 na	0.00	0.00	0.00 na 0.00 na
5/12/2000 3	0	0	10	0.00 0.0		0 0	10	0.00 0.00	0	ő	9		0.00	0	0	10		0.00 0.00	0.00	0.00 0.00 na	0.00	0.00	0.00 na
5/15/2000 6	0	0	10	0.00 0.0		0 0	10	0.00 0.00	0	0	9		0.00	0	0	10		0.00 0.00	0.00	0.00 0.00 na	0.00	0.00	0.00 na
5/17/2000 8 5/19/2000 10	0	0	10 10	0.00 0.0 0.00 0.0		0 0	10 10	0.00 0.00 0.00 0.00	0	0	9		0.00	0	0	10 10		0.00 0.00 0.00 0.00	0.00	0.00 0.00 na 0.00 0.00 na	0.00	0.00	0.00 na 0.00 na
5/22/2000 13	0	Ö	10	0.00 0.0		0 0	10	0.00 0.00	0	Ö	9		0.00	Ö	Ö	10		0.00 0.00	0.00	0.00 0.00 na	0.00	0.00	0.00 na
5/23/2000 14	0	0	10	0.00 0.0		0 0	10	0.00 0.00	0	0	9		0.00	0	0	10		0.00 0.00	0.00	0.00 0.00 na	0.00	0.00	0.00 na
5/24/2000 15 5/25/2000 16	0	0	10 10	0.00 0.0 0.00 0.0		0 0	10 10	0.00 0.00 0.00 0.00	0 1	0 1	8		0.00	0	0	10 10		0.00 0.00 0.00 0.00	0.00 2.78	0.00 0.00 na 30.86 2.78 200.00	0.00	0.00	0.00 na 0.00 na
5/26/2000 17	0	0	10	0.00 0.0		0 0	10	0.00 0.00	1	2	7		0.00	0	0	10		0.00 0.00	5.56	123.46 5.56 200.00	0.00	0.00	0.00 na
5/30/2000 21 5/31/2000 22	0	0	10 10	0.00 0.0 0.00 0.0		0 0	10 10	0.00 0.00 0.00 0.00	2	4	5		0.00	1	1	9		10.00 0.00 10.00 0.00	13.61 13.61	444.75 10.54 154.94 444.75 10.54 154.94	0.00	0.00	0.00 na 0.00 na
6/1/2000 23	0	0	10	0.00 0.0		0 0	10	0.00 0.00	0	4	5		0.00	0	1	9		10.00 0.00	13.61	444.75 10.54 154.94	0.00	0.00	0.00 na
6/2/2000 24	0	0	10	0.00 0.0		0 0	10	0.00 0.00	0	4	5		0.00	0	1	9		10.00 0.00	13.61	444.75 10.54 154.94	0.00	0.00	0.00 na
6/5/2000 27 6/6/2000 28	1 0	1	9	10.00 0.0 10.00 0.0		1 1	9	10.00 0.00 10.00 0.00	0	4	5		0.00	2	3	7		30.00 0.00 30.00 0.00	23.61	281.79 8.39 71.10 281.79 8.39 71.10	0.00	0.00	0.00 na 0.00 na
6/8/2000 30	0	1	9	10.00 0.0		0 1	9	10.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00	23.61	281.79 8.39 71.10	0.00	0.00	0.00 na
6/12/2000 34	1	2	8	20.00 0.0		1 2	8	20.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00	28.61	133.64 5.78 40.41	0.00	0.00	0.00 na
6/13/2000 35 6/14/2000 36	1 0	3	7	30.00 0.0 30.00 0.0		0 2	8 8	20.00 0.00 20.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00 30.00 0.00	31.11 31.11	101.23 5.03 32.34 101.23 5.03 32.34	0.00	0.00	0.00 na 0.00 na
6/15/2000 37	0	3	7	30.00 0.0		0 2	8	20.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00	31.11	101.23 5.03 32.34	0.00	0.00	0.00 na
6/16/2000 38	0	3	7	30.00 0.0		0 2	8	20.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00	31.11	101.23 5.03 32.34	0.00	0.00	0.00 na
6/19/2000 41 6/20/2000 42	0	3	7 7	30.00 0.0 30.00 0.0		0 2	8	20.00 0.00 20.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00 30.00 0.00	31.11 31.11	101.23 5.03 32.34 101.23 5.03 32.34	0.00	0.00	0.00 na 0.00 na
6/21/2000 43	ō	3	7	30.00 0.0	00	0 2	8	20.00 0.00	ō	4	5	44.44 (0.00	ō	3	7		30.00 0.00	31.11	101.23 5.03 32.34	0.00	0.00	0.00 na
6/22/2000 44	0	3	7	30.00 0.0		0 2	8	20.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00	31.11 31.11	101.23 5.03 32.34	0.00	0.00	0.00 na
6/23/2000 45 6/26/2000 48	0	3	7	30.00 0.0 30.00 0.0		0 2	8	20.00 0.00 20.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00 30.00 0.00	31.11	101.23 5.03 32.34 101.23 5.03 32.34	0.00	0.00	0.00 na 0.00 na
6/27/2000 49	ō	3	7	30.00 0.0		0 2	8	20.00 0.00	ō	4	5		0.00	ō	3	7		30.00 0.00	31.11	101.23 5.03 32.34	0.00	0.00	0.00 na
6/28/2000 50 6/29/2000 51	0	3	7	30.00 0.0 30.00 0.0		0 2	8	20.00 0.00 20.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00 30.00 0.00	31.11 31.11	101.23 5.03 32.34 101.23 5.03 32.34	0.00	0.00	0.00 na 0.00 na
6/30/2000 52	0	3	7	30.00 0.0	-	0 2	8	20.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00	31.11	101.23 5.03 32.34	0.00	0.00	0.00 na
7/5/2000 57	0	3	7	30.00 0.0		0 2	8	20.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00	31.11	101.23 5.03 32.34	0.00	0.00	0.00 na
7/6/2000 58 7/7/2000 59	0	3	7	30.00 0.0 30.00 0.0	-	0 2	8	20.00 0.00 20.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00 30.00 0.00	31.11 31.11	101.23 5.03 32.34 101.23 5.03 32.34	0.00	0.00	0.00 na 0.00 na
7/10/2000 62	0	3	7	30.00 0.0		0 2	8	20.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00	31.11	101.23 5.03 32.34	0.00	0.00	0.00 na
7/11/2000 63	0	3	7	30.00 0.0		0 2	8	20.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00	31.11	101.23 5.03 32.34	0.00	0.00	0.00 na
7/12/2000 64 7/13/2000 65	0	3	7	30.00 0.0 30.00 0.0		0 2	8	20.00 0.00 20.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00 30.00 0.00	31.11 31.11	101.23 5.03 32.34 101.23 5.03 32.34	0.00	0.00	0.00 na 0.00 na
7/17/2000 69	0	3	7	30.00 0.0		0 2	8	20.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00	31.11	101.23 5.03 32.34	0.00	0.00	0.00 na
7/18/2000 70	0	3	7	30.00 0.0	-	0 2	8	20.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00	31.11	101.23 5.03 32.34	0.00	0.00	0.00 na
7/19/2000 71 7/20/2000 72	0	3	7 7	30.00 0.0 30.00 0.0		0 2	8 8	20.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00 30.00 0.00	31.11 31.11	101.23 5.03 32.34 101.23 5.03 32.34	0.00	0.00	0.00 na 0.00 na
7/21/2000 73	0	3	7	30.00 0.0	00	0 2	8	20.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00	31.11	101.23 5.03 32.34	0.00	0.00	0.00 na
7/24/2000 76	1	4	6	40.00 0.0		0 2	8	20.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00	33.61 36.11	118.83 5.45 32.43	0.00	0.00	0.00 na
7/25/2000 77 7/26/2000 78	0	4	6 6	40.00 0.0 40.00 0.0		0 3	7	30.00 0.00 30.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00 30.00 0.00	36.11	53.09 3.64 20.18 53.09 3.64 20.18	0.00	0.00	0.00 na 0.00 na
7/27/2000 79	0	4	6	40.00 0.0		0 3	7	30.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00	36.11	53.09 3.64 20.18	0.00	0.00	0.00 na
7/28/2000 80 7/31/2000 83	0	4	6	40.00 0.0 40.00 0.0		0 3	7	30.00 0.00 30.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00 30.00 0.00	36.11 36.11	53.09 3.64 20.18 53.09 3.64 20.18	0.00	0.00	0.00 na 0.00 na
8/1/2000 84	0	4	6	40.00 0.0	-	0 3	7	30.00 0.00	0	4	5		0.00	0	3	7		30.00 0.00	36.11	53.09 3.64 20.18	0.00	0.00	0.00 na
8/3/2000 86	0	4	6	40.00 0.0	-	0 3	7	30.00 0.00	0	4	5		0.00	0	3	7		30.00 10.00		53.09 3.64 20.18	2.50	25.00	2.50 200.00
8/4/2000 87 8/7/2000 90	0	4 6	6	40.00 0.0 60.00 0.0		0 3	7	30.00 0.00 30.00 0.00	0	4	5		0.00	0	3	7		30.00 10.00 30.00 10.00	36.11 41.11	53.09 3.64 20.18 204.94 7.16 34.82	2.50 2.50	25.00 25.00	2.50 200.00 2.50 200.00
8/8/2000 91	0	6	4	60.00 0.0	-	0 3	7	30.00 0.00	1	5	4		0.00	2	5	5		50.00 10.00	48.89	175.31 6.62 27.08	2.50	25.00	2.50 200.00
8/9/2000 92	0	6	4	60.00 0.0	-	0 3	7	30.00 0.00	0	5	4		0.00	0	5	5		50.00 10.00	48.89	175.31 6.62 27.08	2.50	25.00	2.50 200.00
8/10/2000 93 8/11/2000 94	0	6	4	60.00 0.0 60.00 0.0		0 3	7	30.00 0.00 30.00 0.00	0	5 5	4		1.11	0	5	5		50.00 10.00 50.00 10.00	48.89 48.89	175.31 6.62 27.08 175.31 6.62 27.08	5.28 5.28	37.35 37.35	3.06 115.79 3.06 115.79
8/14/2000 97	ő	6	4	60.00 0.0		0 3	7	30.00 0.00	1	6	3	1 66.67 1	1.11	ő	5	5	1 :	50.00 10.00	51.67	255.56 7.99 30.94	5.28	37.35	3.06 115.79
8/15/2000 98 8/16/2000 99	0	6	4	60.00 0.0 60.00 0.0		0 3	7	30.00 0.00 30.00 0.00	0	6	3		1.11	0	5 5	5 5		50.00 10.00 50.00 10.00	51.67 51.67	255.56 7.99 30.94 255.56 7.99 30.94	5.28 5.28	37.35 37.35	3.06 115.79 3.06 115.79
8/17/2000 99	0	6	4	60.00 0.0		0 3	7	30.00 0.00	0	6	3		1.11	0	5	5		50.00 10.00	51.67	255.56 7.99 30.94 255.56 7.99 30.94	5.28	37.35	3.06 115.79
8/18/2000 101	ō	6	4	60.00 0.0	00	0 3	7	30.00 0.00	Ō	6	3	1 66.67 1	1.11	ō	5	5	1	50.00 10.00	51.67	255.56 7.99 30.94	5.28	37.35	3.06 115.79
8/21/2000 104 8/22/2000 105	0	6	4	60.00 0.0 60.00 0.0		0 3	7	30.00 0.00 30.00 0.00	0	6	3		1.11	0	5 5	5 5		50.00 10.00 50.00 10.00	51.67 51.67	255.56 7.99 30.94 255.56 7.99 30.94	5.28 5.28	37.35 37.35	3.06 115.79 3.06 115.79
8/23/2000 106		6	4	60.00 0.0		0 3	7	30.00 0.00	0	6	3		1.11	0	5	5		50.00 10.00	51.67	255.56 7.99 30.94	5.28	37.35	3.06 115.79
8/24/2000 107		6	4	60.00 0.0		1 4	6	40.00 0.00	0	6	3		1.11	0	5	5		50.00 10.00	54.17	136.11 5.83 21.54	5.28	37.35	3.06 115.79
8/25/2000 108	0	6	4	60.00 0.0	JU	0 4	6	40.00 0.00	0	6	3	1 66.67 1	1.11	0	5	5	1	50.00 10.00	54.17	136.11 5.83 21.54	5.28	37.35	3.06 115.79

HOUSATONIC RIVER PROJECT CROSSOVER RANA pipiens DEVELOPMENTAL STUDY 2000 MORTALITY/METAMORPH DATA R1 REFERENCE LARVAE IN SITE 33 (W-8) WATER/SEDIMENT, 120.0 mg/Kg SEDIMENT PCB

									01-2				EM01-3						EM01-4					CUMULA	TIVE	1		CUMUL/	TIVE	
NO.	CUMUL.	CUMUL.	CUMUL. %		%	NO. (CUMUL.	CUMUL.	CUMUL. %	%	NO.	CUMUL.	CUMUL.	CUMUL.	. %	%	NO.	CUMUL.	CUMUL.	CUMUL.	%	%	MOR'	TALITY S	TATIST	ics	MET	AMORPH !	STATIST	rics
Y DEA	D DEAD	LIVE	METAM. DEA	D M	ИЕТАМ.	DEAD	DEAD	LIVE	METAM. DEA	D METAM.	DEAD	DEAD	LIVE	METAM	DEAD	METAM.	DEAD	DEAD	LIVE	METAM.	DEAD	METAM.	MEAN %	VAR (S2)	SEM /	CV (%)	MEAN %	VAR (S2)	SEM	CV (%)
															00.07			_	_		E0.00	40.00						07.05		445.70
1 0	ь	4				U	4	ь			U	6	3	- 1		11.11	U	5	5	1			54.17	136.11	5.83	21.54			3.06	115.79
2 0	6	4	60.0	10	0.00	0	4	6	40.0	0.00	0	6	3	1	66.67	11.11	0	5	5	1	50.00	10.00	54.17	136.11	5.83	21.54	5.28	37.35	3.06	115.79
3 0	6	4	60.0	10	0.00	0	4	6	40.0	0.00	0	6	3	1	66.67	11.11	0	5	5	1	50.00	10.00	54.17	136.11	5.83	21.54	5.28	37.35	3.06	115.79
1 0	6	4			0.00	0	4	6	40.0	0.00	0	6	3	1	66.67	11.11	0	5	5	1	50.00	10.00	54.17	136.11	5.83	21.54	5.28	37.35	3.06	115.79
5 0	6	4	60.0	10	0.00	0	4	6	40.0	0.00	0	6	3	1	66.67	11.11	0	5	5	1	50.00	10.00	54.17	136.11	5.83	21.54	5.28	37.35	3.06	115.79
0	6	4	60.0	10	0.00	1	5	5	50.0	0.00	0	6	3	1	66.67	11.11	0	5	5	1	50.00	10.00	56.67	66.67	4.08	14.41	5.28	37.35	3.06	115.79
0 0	6	4	60.0	10	0.00	0	5	5	50.0	0.00	0	6	3	1	66.67	11.11	0	5	5	1	50.00	10.00	56.67	66.67	4.08	14.41	5.28	37.35	3.06	115.79
1 0	6	4	60.0	10	0.00	0	5	5	50.0	0.00	0	6	3	1	66.67	11.11	0	5	5	1	50.00	10.00	56.67	66.67	4.08	14.41	5.28	37.35	3.06	115.79
2 0	6	4	60.0	10	0.00	0	5	5	50.0	0.00	0	6	3	1	66.67	11.11	0	5	5	1	50.00	10.00	56.67	66.67	4.08	14.41	5.28	37.35	3.06	115.79
5 0	6	4	60.0	10	0.00	0	5	5	50.0	0.00	0	6	3	1	66.67	11.11	0	5	5	1	50.00	10.00	56.67	66.67	4.08	14.41	5.28	37.35	3.06	115.79
0 6	6	4	60.0	10	0.00	0	5	5	50.0	0.00	0	6	3	1	66.67	11.11	0	5	5	1	50.00	10.00	56.67	66.67	4.08	14.41	5.28	37.35	3.06	115.79
7 0	6	4	60.0	10	0.00	0	5	5	50.0	0.00	0	6	3	1	66.67	11.11	0	5	5	1	50.00	10.00	56.67	66.67	4.08	14.41	5.28	37.35	3.06	115.79
3 0	6	4	60.0	10	0.00	0	5	5	50.0	0.00	0	6	3	1	66.67	11.11	0	5	5	1	50.00	10.00	56.67	66.67	4.08	14.41	5.28	37.35	3.06	115.79
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HOUSATONIC RIVER PROJECT CROSSOVER RANA pipiens DEVELOPMENTAL STUDY 2000 MORTALITY/METAMORPH DATA R3 REFERENCE LARVAE IN SITE 33 (W-8) WATER/SEDIMENT, 120.0 mg/Kg SEDIMENT PCB

				EW	101-1					EM	01-2				EM01-	3					EM01-4			ĺ		CUMULATIVE	l	CUMUL	ATIVE
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B3112000 99								-						_					-	1		_							
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	9/14/2000 11	0	8	12	2	40.00	10.00	0	7	13	2	35.00 10.	0	7	13	1	35.00	5.00	0	4	16	2	20.00	10.00	32.50	75.00 4.33 26.65	8.75	6.25	1.25 28.57

HOUSATONIC RIVER PROJECT CROSSOVER RANA pipiens DEVELOPMENTAL STUDY 2000 MORTALITY/METAMORPH DATA R3 REFERENCE LARVAE IN REFERENCE SITE 40 (MP), 0.04 mg/Kg SEDIMENT PCB

					EM01-1					EMO							101-3						101-4				CUMUL	ATIVE	1		CUMULA	TIVE	
DATE	DAY	NO DEA			IL. CUMUL. % METAM. DE		% METAM	NO. DEAD	CUMUL. DEAD	CUMUL. LIVE	CUMUL. METAM. D	% EAD	% METAM	NO. DEAD			CUMUL. METAM.		% METAM	NO. DEAD		CUMUL.	CUMUL.		% METAM		RTALITY :					TATISTICS SEM CV (%	961
DATE	DAI	DEF	ID DEAD	LIVE	WETAW. DE	HD IVI	IL I AW.	DEAD	DEAD	LIVE	WETAW. L	EAD	WE I AW.	DEAD	DEAD	LIVE	IVIE I AIVI.	DEAD	IVIE I AIVI.	DEAD	DEAD	LIVE	IVIE I AIVI.	DEAD	IVIE I AIVI.	IVIEAIN 70	VAR (32)	SEIVI	CV (76)	IVIEAIN 70	VAR (32)	SEIVI CV (7	/0)
5/24/2000		0	0	20	0.0		0.00	0	0	20		0.00	0.00	0	0	20		0.00	0.00	0	0	20		0.00	0.00	0.00	0.00	0.00	na	0.00	0.00	0.00 na	
5/25/2000 5/26/2000		0	0	20 20	0.0		0.00	1	1	19 19		5.00	0.00	3	3	17 17		15.00 15.00	0.00	1	2	19 18		5.00 10.00	0.00	6.25 7.50	39.58 41.67	3.15 3.23	100.66 86.07	0.00	0.00	0.00 na 0.00 na	
5/30/2000	6	0	0	20	0.0	00	0.00	0	1	19		5.00	0.00	0	3	17		15.00	0.00	0	2	18		10.00	0.00	7.50	41.67	3.23	86.07	0.00	0.00	0.00 na	
5/31/2000		0	0	20	0.0		0.00	1	2	18		0.00	0.00	0	3	17		15.00	0.00	1	3	17		15.00	0.00	10.00	50.00	3.54	70.71	0.00	0.00	0.00 na	
6/1/2000 6/2/2000		0	0	20 20	0.0		0.00	0	2	18 18		0.00	0.00	0	3	17 17		15.00 15.00	0.00	0	3	17 17		15.00 15.00	0.00	10.00 10.00	50.00 50.00	3.54 3.54	70.71 70.71	0.00	0.00	0.00 na 0.00 na	
6/5/2000	12	0	0	20	0.0	00	0.00	0	2	18	1	0.00	0.00	0	3	17		15.00	0.00	0	3	17		15.00	0.00	10.00	50.00	3.54	70.71	0.00	0.00	0.00 na	
6/6/2000 6/8/2000		0	0	20 20	0.0		0.00	1	3	17 17		5.00 5.00	0.00	0	3	17 17		15.00 15.00	0.00	0	3	17 17		15.00 15.00	0.00	11.25 11.25	56.25 56.25	3.75 3.75	66.67 66.67	0.00	0.00	0.00 na 0.00 na	
6/9/2000		ő	0	20	0.0		0.00	0	3	17		5.00	0.00	0	3	17		15.00	0.00	o	3	17		15.00	0.00	11.25	56.25	3.75	66.67	0.00	0.00	0.00 na	
6/12/2000		0	0	20	0.0		0.00	0	3	17		5.00	0.00	0	3	17		15.00	0.00	0	3	17		15.00	0.00	11.25	56.25	3.75	66.67	0.00	0.00	0.00 na	
6/13/2000 6/14/2000		0	0	20 20	0.0		0.00	0	3	17 17		5.00 5.00	0.00	0	3	17 17		15.00 15.00	0.00	0	3	17 17		15.00 15.00	0.00	11.25 11.25	56.25 56.25	3.75 3.75	66.67 66.67	0.00	0.00	0.00 na 0.00 na	
6/15/2000		ő	0	20	0.0		0.00	0	3	17		5.00	0.00	0	3	17		15.00	0.00	ő	3	17		15.00	0.00	11.25	56.25	3.75	66.67	0.00	0.00	0.00 na	
6/16/2000		0	0	20	0.0		0.00	0	3	17		5.00	0.00	0	3	17		15.00	0.00	0	3	17		15.00	0.00	11.25	56.25	3.75	66.67	0.00	0.00	0.00 na	
6/19/2000		0	0	20 20	0.0		0.00	0	4	17 16		5.00 0.00	0.00	0	3	17 17		15.00 15.00	0.00	0	3	17 17		15.00 15.00	0.00	11.25 12.50	56.25 75.00	3.75 4.33	66.67 69.28	0.00	0.00	0.00 na 0.00 na	
6/21/2000	28	ō	ō	20	0.0	00	0.00	Ó	4	16		0.00	0.00	Ō	3	17		15.00	0.00	ō	3	17		15.00	0.00	12.50	75.00	4.33	69.28	0.00	0.00	0.00 na	
6/22/2000		0	0	20 20	0.0		0.00	0	4	16 16		0.00	0.00	0	3	17 17		15.00 15.00	0.00	0	3	17 17		15.00 15.00	0.00	12.50 12.50	75.00 75.00	4.33 4.33	69.28 69.28	0.00	0.00	0.00 na 0.00 na	
6/26/2000		0	0	20	0.0		0.00	0	4	16		0.00	0.00	0	3	17		15.00	0.00	0	3	17		15.00	0.00	12.50	75.00	4.33	69.28	0.00	0.00	0.00 na	
6/27/2000		0	0	20	0.0		0.00	0	4	16		0.00	0.00	0	3	17		15.00	0.00	0	3	17		15.00	0.00	12.50	75.00	4.33	69.28	0.00	0.00	0.00 na	
6/28/2000		0	0	20 20	0.0		0.00	0	4	16 16		0.00	0.00	0	3	17 17		15.00 15.00	0.00	0	3	17 17		15.00 15.00	0.00	12.50 12.50	75.00 75.00	4.33 4.33	69.28 69.28	0.00	0.00	0.00 na 0.00 na	
6/30/2000		0	0	20	0.0		0.00	0	4	16		0.00	0.00	0	3	17		15.00	0.00	0	3	17		15.00	0.00	12.50	75.00	4.33	69.28	0.00	0.00	0.00 na	
7/5/2000		0	0	20	0.0		0.00	0	4	16		0.00	0.00	0	3	17		15.00	0.00	1	4	16		20.00	0.00	13.75	89.58	4.73	68.84	0.00	0.00	0.00 na	
7/6/2000 7/10/2000		0	0	20 20	0.0		0.00	0	4	16 16		0.00	0.00	0	3	17 17		15.00 15.00	0.00	0	4	16 16		20.00	0.00	13.75 13.75	89.58 89.58	4.73 4.73	68.84 68.84	0.00	0.00	0.00 na 0.00 na	
7/11/2000		ő	0	20	0.0		0.00	0	4	16		0.00	0.00	0	3	17		15.00	0.00	ő	4	16		20.00	0.00	13.75	89.58	4.73	68.84	0.00	0.00	0.00 na	
7/12/2000		0	0	20	0.0		0.00	0	4	16		0.00	0.00	0	3	17		15.00	0.00	0	4	16		20.00	0.00	13.75	89.58	4.73	68.84	0.00	0.00	0.00 na	
7/13/2000 7/17/2000		0	0	20 20	0.0		0.00	0	4	16 16		0.00	0.00	0	3	17 17		15.00 15.00	0.00	0	4	16 16		20.00	0.00	13.75 13.75	89.58 89.58	4.73 4.73	68.84 68.84	0.00	0.00	0.00 na 0.00 na	
7/18/2000	55	5	5	15	25.		0.00	Ö	4	16		0.00	0.00	0	3	17		15.00	0.00	ő	4	16		20.00	0.00	20.00	16.67	2.04	20.41	0.00	0.00	0.00 na	
7/19/2000		0	5	15	25.		0.00	0	4	16		0.00	0.00	0	3	17		15.00	0.00	0	4	16		20.00	0.00	20.00	16.67	2.04	20.41	0.00	0.00	0.00 na	
7/20/2000 7/21/2000			6	14 14	30. 30.		0.00	0	4	16 16		0.00	0.00	0 1	3 4	17 16		15.00 20.00	0.00	0	4	16 16		20.00	0.00	21.25 22.50	39.58 25.00	3.15 2.50	29.61 22.22	0.00	0.00	0.00 na 0.00 na	
7/24/2000	61	0	6	14	30.	00	0.00	0	4	16	2	0.00	0.00	0	4	16		20.00	0.00	0	4	16		20.00	0.00	22.50	25.00	2.50	22.22	0.00	0.00	0.00 na	
7/25/2000 7/26/2000		0	6	14 14	30. 30.		0.00	0	4	16 16		0.00	0.00	0	4	16 16		20.00	0.00	0	4	16 16		20.00	0.00	22.50 22.50	25.00 25.00	2.50 2.50	22.22 22.22	0.00	0.00	0.00 na 0.00 na	
7/27/2000		0	6	14	30.		0.00	0	4	16		0.00	0.00	0	4	16		20.00	0.00	0	4	16		20.00	0.00	22.50	25.00	2.50	22.22	0.00	0.00	0.00 na	
7/28/2000		0	6	14	30.		0.00	0	4	16		0.00	0.00	0	4	16		20.00	0.00	0	4	16		20.00	0.00	22.50	25.00	2.50	22.22	0.00	0.00	0.00 na	
7/31/2000 8/1/2000		0	6	14 14	30. 30.		0.00	0	4	16 16		0.00	0.00	0	4	16 16		20.00	0.00	0	4	16 16		20.00	0.00	22.50 22.50	25.00 25.00	2.50 2.50	22.22 22.22	0.00	0.00	0.00 na 0.00 na	
8/3/2000	71	1	7	13	35.		0.00	0	4	16		0.00	0.00	0	4	16		20.00	0.00	0	4	16		20.00	0.00	23.75	56.25	3.75	31.58	0.00	0.00	0.00 na	
8/7/2000		0	7	13	35.		0.00	0	4	16		0.00	0.00	0	4	16		20.00	0.00	0	4	16		20.00	0.00	23.75	56.25	3.75	31.58	0.00	0.00	0.00 na	
8/8/2000 8/9/2000		0	7	13 13	35. 35.		0.00	0	5 5	15 15		5.00 5.00	0.00	1	5 5	15 15		25.00 25.00	0.00	0	4	16 16		20.00	0.00	26.25 26.25	39.58 39.58	3.15 3.15	23.97 23.97	0.00	0.00	0.00 na 0.00 na	
8/10/2000		0	7	13	35.		0.00	0	5	15		5.00	0.00	0	5	15		25.00	0.00	0	4	16		20.00	0.00	26.25	39.58	3.15	23.97	0.00	0.00	0.00 na	
8/11/2000 8/14/2000		0	7	13 13	35. 35.		0.00	0	5 5	15 15		5.00 5.00	0.00	0	5 5	15 15		25.00 25.00	0.00	0	4	16 16		20.00 20.00	0.00	26.25 26.25	39.58 39.58	3.15 3.15	23.97 23.97	0.00	0.00	0.00 na 0.00 na	
8/15/2000		0	7	13	35.		0.00	0	5	15		5.00	0.00	0	5	15		25.00	0.00	1	5	15		25.00	0.00	27.50	25.00	2.50	18.18	0.00	0.00	0.00 na	
8/16/2000	84	0	7	13	35.	00	0.00	0	5	15	1 2	5.00	5.00	0	5	15	1	25.00	5.00	0	5	15		25.00	0.00	27.50	25.00	2.50	18.18	2.50	8.33	1.44 115.4	
8/17/2000 8/18/2000		0	7	13 13	35. 35.		0.00	0	5 5	15 15		5.00 5.00	5.00 5.00	0	5 5	15 15	1	25.00 25.00	5.00 5.00	0	5 5	15 15		25.00 25.00	0.00	27.50 27.50	25.00 25.00	2.50 2.50	18.18 18.18	2.50 2.50	8.33 8.33	1.44 115.4 1.44 115.4	
8/21/2000		ő	7	13	35.		0.00	0	5	15		5.00	5.00	0	5	15	1	25.00	5.00	o	5	15		25.00	0.00	27.50	25.00	2.50	18.18	2.50	8.33	1.44 115.4	
8/22/2000		0	7	13	35.		0.00	0	5	15		5.00	5.00	0	5	15	1	25.00	5.00	0	5	15		25.00	0.00	27.50	25.00	2.50	18.18	2.50	8.33	1.44 115.4	
8/23/2000 8/24/2000		0	7 7	13 13	35. 35.		0.00	0	5 5	15 15		5.00 5.00	5.00 5.00	0	5 5	15 15	1	25.00 25.00	5.00 5.00	0	5	15 15		25.00 25.00	0.00	27.50 27.50	25.00 25.00	2.50	18.18 18.18	2.50 2.50	8.33 8.33	1.44 115.4 1.44 115.4	
8/25/2000	93	0	7	13	35.	00	0.00	0	5	15	1 2	5.00	5.00	Ö	5	15	i	25.00	5.00	0	5	15		25.00	0.00	27.50	25.00	2.50	18.18	2.50	8.33	1.44 115.4	47
8/28/2000 9/10/2000		1	8 12	12	40. 60.		0.00	0	5	15		5.00	10.00 10.00	0 7	5	15	1	25.00 60.00	5.00 5.00	0	5 7	15 13		25.00	0.00	28.75 45.00	56.25	3.75	26.09 39.54	3.75 3.75	22.92	2.39 127.6 2.39 127.6	
9/10/2000		0	12	8	60.		0.00	0	5 5	15 15		5.00 5.00	10.00	0	12 12	8	1	60.00	5.00	0	7	13		35.00 35.00	0.00	45.00 45.00	316.67 316.67	8.90 8.90	39.54	3.75	22.92 22.92	2.39 127.6	
9/12/2000	111	ō	12	8	60.	00	0.00	ō	5	15	2 2	5.00	10.00	ō	12	8	1	60.00	5.00	ō	7	13		35.00	0.00	45.00	316.67	8.90	39.54	3.75	22.92	2.39 127.6	66
9/13/2000 9/14/2000			12 12	8	60. 60.		0.00	0	5 5	15 15		5.00 5.00	10.00 10.00	0	12 12	8	1	60.00 60.00	5.00 5.00	0	7	13 13		35.00 35.00	0.00	45.00 45.00	316.67 316.67	8.90 8.90	39.54 39.54	3.75 3.75	22.92 22.92	2.39 127.6 2.39 127.6	
3/14/2000	, 113	0	12	٥	00.		0.00	U	3	15		0.00	10.00	Ü	12	Ü		30.00	5.00	Ü		10		55.00	0.00	40.00	310.07	0.00	33.54	3.73	££.3£	2.55 127.0	,,,

HOUSATONIC RIVER PROJECT CROSSOVER RANA pipiens DEVELOPMENTAL STUDY 2000 MORTALITY/METAMORPH DATA R3 REFERENCE LARVAE IN REFERENCE SITE 40 (MP), 0.04 mg/Kg SEDIMENT PCB

		l no	CUMUII		M02-1 L. CUMUL.	%	%	l NO	CUMUI	EMO		%	%	l NO	CUMU	EM CUMUL.	02-3	%	%	l no.	CUMUL.		102-4	%	%	мо	CUMUL/		100		CUMULA	TIVE
DATE	DAY	DEAD	DEAD.	LIVE				DEAD	DEAD.		METAM. D		METAM.	DEAD			METAM.						METAM.									SEM CV (%)
5/24/2000	0	0	0	20		0.00	0.00	0	0	20		0.00	0.00	0	0	20		0.00	0.00	0	0	20		0.00	0.00	0.00	0.00	0.00	na	0.00	0.00	0.00 na
5/25/2000	1	1	1	19		5.00	0.00	1	1	19		5.00	0.00	0	ō	20		0.00	0.00	0	ō	20		0.00	0.00	2.50	8.33	1.44	115.47	0.00	0.00	0.00 na
5/26/2000 5/30/2000	2 6	1	2	18 17		10.00 15.00	0.00	0	1	19 19		5.00 5.00	0.00	1	1 2	19 18		5.00 10.00	0.00	1	1	19 19		5.00 5.00	0.00	6.25 8.75	6.25 22.92	1.25	40.00 54.71	0.00	0.00	0.00 na 0.00 na
5/31/2000	7	1	4	16		20.00	0.00	1	2	18	1	0.00	0.00	1	3	17		15.00	0.00	ő	i .	19		5.00	0.00	12.50	41.67	3.23	51.64	0.00	0.00	0.00 na
6/1/2000 6/2/2000	8	0	4	16 16		20.00	0.00	0	2	18 18		0.00	0.00	0	3	17 17		15.00 15.00	0.00	0	1	19 19		5.00 5.00	0.00	12.50 12.50	41.67 41.67	3.23	51.64 51.64	0.00	0.00	0.00 na 0.00 na
6/5/2000	12	0	4	16		20.00	0.00	ő	2	18		0.00	0.00	0	3	17		15.00	0.00	0	i	19		5.00	0.00	12.50	41.67	3.23	51.64	0.00	0.00	0.00 na
6/6/2000 6/8/2000	13 15	1	5 5	15 15		25.00 25.00	0.00	0	2	18 18		0.00	0.00	0	3	17 17		15.00 15.00	0.00	0	1	19 19		5.00 5.00	0.00	13.75 13.75	72.92 72.92	4.27 4.27	62.10 62.10	0.00	0.00	0.00 na 0.00 na
6/9/2000	16	0	5	15		25.00	0.00	0	2	18		0.00	0.00	0	3	17		15.00	0.00	0	1	19		5.00	0.00	13.75	72.92	4.27	62.10	0.00	0.00	0.00 na
6/12/2000	19 20	0	5	15		25.00	0.00	0	2	18		0.00	0.00	0	3	17 17		15.00	0.00	0	1	19		5.00	0.00	13.75	72.92	4.27	62.10	0.00	0.00	0.00 na
6/13/2000 6/14/2000	20	0	5 5	15 15		25.00 25.00	0.00	0	2	18 18		0.00	0.00	0	3	17		15.00 15.00	0.00	0	1	19 19		5.00 5.00	0.00	13.75 13.75	72.92 72.92	4.27 4.27	62.10 62.10	0.00	0.00	0.00 na 0.00 na
6/15/2000	22	0	5	15		25.00	0.00	0	2	18		0.00	0.00	0	3	17		15.00	0.00	0	1	19		5.00	0.00	13.75	72.92	4.27	62.10	0.00	0.00	0.00 na
6/16/2000 6/19/2000	23 26	0	5 5	15 15		25.00 25.00	0.00	0	2	18 18		0.00	0.00	0	3	17 17		15.00 15.00	0.00	0	1	19 19		5.00 5.00	0.00	13.75 13.75	72.92 72.92	4.27 4.27	62.10 62.10	0.00	0.00	0.00 na 0.00 na
6/20/2000	27	ō	5	15		25.00	0.00	ō	2	18	1	0.00	0.00	0	3	17		15.00	0.00	0	1	19		5.00	0.00	13.75	72.92	4.27	62.10	0.00	0.00	0.00 na
6/21/2000 6/22/2000	28 29	0	5	15 15		25.00 25.00	0.00	0	2	18 18		0.00	0.00	0	3	17 17		15.00 15.00	0.00	0	1	19 19		5.00 5.00	0.00	13.75 13.75	72.92 72.92	4.27 4.27	62.10 62.10	0.00	0.00	0.00 na 0.00 na
6/23/2000	30	ō	5	15		25.00	0.00	ő	2	18		0.00	0.00	0	3	17		15.00	0.00	0	i	19		5.00	0.00	13.75	72.92	4.27	62.10	0.00	0.00	0.00 na
6/26/2000 6/27/2000	33 34	0	5	15 15		25.00 25.00	0.00	0	2	18 18		0.00	0.00	0	3	17 17		15.00 15.00	0.00	0	1 2	19 18		5.00 10.00	0.00	13.75 15.00	72.92 50.00	4.27 3.54	62.10 47.14	0.00	0.00	0.00 na 0.00 na
6/28/2000	35	0	5	15		25.00	0.00	0	2	18		0.00	0.00	0	3	17		15.00	0.00	0	2	18		10.00	0.00	15.00	50.00	3.54	47.14	0.00	0.00	0.00 na
6/29/2000 6/30/2000	36 37	0	5 5	15		25.00 25.00	0.00	0	2	18 18		0.00	0.00	0	3	17 17		15.00	0.00	0	2	18 18		10.00	0.00	15.00 15.00	50.00	3.54	47.14 47.14	0.00	0.00	0.00 na 0.00 na
7/5/2000	42	0	5	15 15		25.00	0.00	0	2	18 18		0.00	0.00	0	3	17		15.00 15.00	0.00	0	2	18 18		10.00 10.00	0.00	15.00	50.00 50.00	3.54 3.54	47.14	0.00	0.00	0.00 na 0.00 na
7/6/2000	43	0	5	15		25.00	0.00	0	2	18	1	0.00	0.00	0	3	17		15.00	0.00	0	2	18		10.00	0.00	15.00	50.00	3.54	47.14	0.00	0.00	0.00 na
7/10/2000 7/11/2000	47 48	0	5	15 15		25.00 25.00	0.00	0	2	18 18		0.00	0.00	0	3	17 17		15.00 15.00	0.00	0	2	18 18		10.00 10.00	0.00	15.00 15.00	50.00 50.00	3.54 3.54	47.14 47.14	0.00	0.00	0.00 na 0.00 na
7/12/2000	49	0	5	15		25.00	0.00	0	2	18	1	0.00	0.00	0	3	17		15.00	0.00	0	2	18		10.00	0.00	15.00	50.00	3.54	47.14	0.00	0.00	0.00 na
7/13/2000 7/17/2000	50 54	0	5 5	15 15		25.00 25.00	0.00	0	2	18 18		0.00	0.00	0	3	17 17		15.00 15.00	0.00	0	2	18 18		10.00	0.00	15.00 15.00	50.00 50.00	3.54 3.54	47.14 47.14	0.00	0.00	0.00 na 0.00 na
7/18/2000	55	ō	5	15		25.00	0.00	ő	2	18	1	0.00	0.00	1	4	16		20.00	0.00	0	2	18		10.00	0.00	16.25	56.25	3.75	46.15	0.00	0.00	0.00 na
7/19/2000 7/20/2000	56 57	0	5 5	15 15		25.00 25.00	0.00	0	2	18 18		0.00	0.00	0	4	16 16		20.00	0.00	0	2	18 18		10.00 10.00	0.00	16.25 16.25	56.25 56.25	3.75 3.75	46.15 46.15	0.00	0.00	0.00 na 0.00 na
7/21/2000	58	0	5	15		25.00	0.00	0	2	18		0.00	0.00	0	4	16		20.00	0.00	0	2	18		10.00	0.00	16.25	56.25	3.75	46.15	0.00	0.00	0.00 na
7/24/2000	61	0	5	15		25.00	0.00	0	2	18		0.00	0.00	0	4	16		20.00	0.00	0	2	18		10.00	0.00	16.25	56.25	3.75	46.15	0.00	0.00	0.00 na
7/25/2000 7/26/2000	62 63	0	5 5	15 15		25.00 25.00	0.00	0	2	18 18		0.00	0.00	0	4	16 16		20.00	0.00	0	2	18 18		10.00	0.00	16.25 16.25	56.25 56.25	3.75 3.75	46.15 46.15	0.00	0.00	0.00 na 0.00 na
7/27/2000	64	0	5	15		25.00	0.00	0	2	18		0.00	0.00	0	4	16		20.00	0.00	0	2	18		10.00	0.00	16.25	56.25	3.75	46.15	0.00	0.00	0.00 na
7/28/2000 7/31/2000	65 68	0	5 5	15 15		25.00 25.00	0.00	0	2	18 18		0.00	0.00	0	4	16 16		20.00	0.00	0	2	18 18		10.00 10.00	0.00	16.25 16.25	56.25 56.25	3.75 3.75	46.15 46.15	0.00	0.00	0.00 na 0.00 na
8/1/2000	69	ō	5	15		25.00	0.00	ō	2	18	1	0.00	0.00	0	4	16		20.00	0.00	ō	2	18		10.00	0.00	16.25	56.25	3.75	46.15	0.00	0.00	0.00 na
8/3/2000 8/7/2000	71 75	0	5	15 15		25.00 25.00	0.00	0	2	18 18		0.00	0.00	0	4	16 16		20.00	0.00	0	2	18 18		10.00 10.00	0.00	16.25 16.25	56.25 56.25	3.75 3.75	46.15 46.15	0.00	0.00	0.00 na 0.00 na
8/8/2000	76	0	5	15		25.00	0.00	ō	2	18	1	0.00	0.00	0	4	16		20.00	0.00	1	3	17		15.00	0.00	17.50	41.67	3.23	36.89	0.00	0.00	0.00 na
8/9/2000 8/10/2000	77 78	0	5	15 15		25.00 25.00	0.00	0	2	18 18		0.00	0.00	0	4	16 16		20.00	0.00	0	3	17 17		15.00 15.00	0.00	17.50 17.50	41.67 41.67	3.23	36.89 36.89	0.00	0.00	0.00 na 0.00 na
8/11/2000	79	ō	5	15		25.00	0.00	ő	2	18		0.00	0.00	0	4	16		20.00	0.00	0	3	17		15.00	0.00	17.50	41.67	3.23	36.89	0.00	0.00	0.00 na
8/14/2000 8/15/2000	82 83	0	5 5	15 15		25.00 25.00	0.00	0	2	18 18		0.00	0.00	0	4	16 16		20.00	0.00	0	3	17 17		15.00 15.00	0.00	17.50 17.50	41.67 41.67	3.23	36.89 36.89	0.00	0.00	0.00 na 0.00 na
8/16/2000	84	0	5	15		25.00	0.00	0	2	18		0.00	0.00	0	4	16	2	20.00	10.00	0	3	17		15.00	0.00	17.50	41.67	3.23	36.89	2.50	25.00	2.50 200.00
8/17/2000	85	0	5	15		25.00	0.00	0	2	18		0.00	0.00	0	4	16	2	20.00	10.00	0	3	17		15.00	0.00	17.50	41.67	3.23	36.89	2.50	25.00	2.50 200.00
8/18/2000 8/21/2000	86 89	0	5	15 15		25.00 25.00	0.00	0	2	18 18		0.00	0.00	0	4 5	16 15	2	20.00 25.00	10.00 10.00	0	3	17 17		15.00 15.00	0.00	17.50 18.75	41.67 56.25	3.23 3.75	36.89 40.00	2.50 2.50	25.00 25.00	2.50 200.00 2.50 200.00
8/22/2000	90	ō	5	15		25.00	0.00	ō	2	18	1	0.00	0.00	0	5	15	2	25.00	10.00	ō	3	17		15.00	0.00	18.75	56.25	3.75	40.00	2.50	25.00	2.50 200.00
8/23/2000 8/24/2000	91 92	1	6	14 14		30.00	0.00	0	2	18 18		0.00	10.00 10.00	0	5 5	15 15	2	25.00 25.00	10.00 10.00	0	3	17 17		15.00 15.00	0.00	20.00 20.00	83.33 83.33	4.56 4.56	45.64 45.64	5.00 5.00	33.33 33.33	2.89 115.47 2.89 115.47
8/25/2000	93	0	6	14		30.00	0.00	ō	2	18	2 1	0.00	10.00	Ö	5	15	2	25.00	10.00	ō	3	17		15.00	0.00	20.00	83.33	4.56	45.64	5.00	33.33	2.89 115.47
8/28/2000 9/10/2000	96 109	1 5	7 12	13 8		35.00 60.00	0.00	0	2 8	18 12		0.00	15.00 15.00	0 5	5 10	15 10	2	25.00 50.00	10.00 10.00	0	3	17 16	1	15.00 20.00	5.00 5.00	21.25 42.50	122.92 291.67	5.54 8.54	52.17 40.18	7.50 7.50	41.67 41.67	3.23 86.07 3.23 86.07
9/11/2000	110	ō	12	8		60.00	0.00	ō	8	12	3 4	0.00	15.00	0	10	10	2	50.00	10.00	Ö	4	16	1	20.00	5.00	42.50	291.67	8.54	40.18	7.50	41.67	3.23 86.07
9/12/2000	111 112	0	12 12	8		60.00	0.00	0	8	12 12		0.00	15.00	0	10 10	10 10	2	50.00	10.00	0	4	16 16	1	20.00	5.00 5.00	42.50 42.50	291.67 291.67	8.54 8.54	40.18 40.18	7.50 7.50	41.67 41.67	3.23 86.07 3.23 86.07
9/13/2000 9/14/2000		0	12	8		60.00	0.00	0	8	12		0.00 0.00	15.00 15.00	0	10	10	2	50.00 50.00	10.00	0	4	16	1	20.00	5.00	42.50 42.50	291.67	8.54	40.18	7.50		3.23 86.07
		<u> </u>]																								

HOUSATONIC RIVER PROJECT CROSSOVER RANA pipiens DEVELOPMENTAL STUDY 2000 MORTALITY/METAMORPH DATA R3 REFERENCE LARVAE IN REFERENCE SITE 40 (MP), 0.04 mg/Kg SEDIMENT PCB

COMBINED EGG MASS STATISTICS

															COM	IBINED	EGG M	ASS S	TATIS	TICS															
		1																											MEA				MEAN		
0.75	D.4.1		CUMUL.				%	NO. CL									CUMUL						CUMUL.				%		RTALITY				AMORPH S		
DATE [DAY	DEAD	DEAD	LIVE	METAM.	DEAD MI	ETAM.	DEAD D	EAD	LIVE	METAN	. DEAD) ME	ETAM.	DEAD	DEAD	LIVE	META	M. DE	AD MEI	AM. L	DEAD	DEAD	LIVE	METAM	DEAD	METAM	MEAN %	VAR (S2)	SEM	CV (%)	MEAN %	VAR (S2)	SEM C	√ (%)
5/24/2000	0																											0.00	0.00	0.00		0.00	0.00	0.00	na
	1																											4.38	0.00 7.03	0.00 1.88	na 60.61	0.00	0.00		na
	2																											6.88	0.78	0.63	12.86	0.00	0.00		na
	6																											8.13	0.78	0.63	10.88	0.00	0.00		na
	7																											11.25	3.13	1.25	15.71	0.00	0.00		na
	8																											11.25	3.13	1.25	15.71	0.00	0.00		na
	9																											11.25	3.13	1.25	15.71	0.00	0.00		na
	12																											11.25	3.13	1.25	15.71	0.00	0.00		na
	13																											12.50	3.13	1.25	14.14	0.00	0.00		na
6/8/2000	15																											12.50	3.13	1.25	14.14	0.00	0.00	0.00	na
	16																											12.50	3.13	1.25	14.14	0.00	0.00		na
6/12/2000	19																											12.50	3.13	1.25	14.14	0.00	0.00	0.00	na
6/13/2000	20																											12.50	3.13	1.25	14.14	0.00	0.00	0.00	na
	21																											12.50	3.13	1.25	14.14	0.00	0.00		na
	22																											12.50	3.13	1.25	14.14	0.00	0.00		na
	23																											12.50	3.13	1.25	14.14	0.00	0.00		na
	26																											12.50	3.13	1.25	14.14	0.00	0.00		na
	27 28																											13.13	0.78 0.78	0.63	6.73	0.00	0.00		na
	29																											13.13 13.13	0.78	0.63	6.73 6.73	0.00	0.00		na na
	30																											13.13	0.78	0.63	6.73	0.00	0.00		na
	33																											13.13	0.78	0.63	6.73	0.00	0.00		na
	34																											13.75	3.13	1.25	12.86	0.00	0.00		na
	35																											13.75	3.13	1.25	12.86	0.00	0.00		na
	36																											13.75	3.13	1.25	12.86	0.00	0.00		na
6/30/2000	37																											13.75	3.13	1.25	12.86	0.00	0.00	0.00	na
	42																											14.38	0.78	0.63	6.15	0.00	0.00	0.00	na
	43																											14.38	0.78	0.63	6.15	0.00	0.00		na
	47																											14.38	0.78	0.63	6.15	0.00	0.00		na
	48																											14.38	0.78	0.63	6.15	0.00	0.00		na
	49																											14.38	0.78	0.63	6.15	0.00	0.00		na
	50 54																											14.38	0.78 0.78	0.63	6.15	0.00	0.00		na na
	55																											14.38 18.13	7.03	0.63 1.88	6.15 14.63	0.00	0.00		na
	56																											18.13	7.03	1.88	14.63	0.00	0.00		na
	57																											18.75	12.50	2.50	18.86	0.00	0.00		na
	58																											19.38	19.53	3.13	22.81	0.00	0.00		na
	61																											19.38	19.53	3.13	22.81	0.00	0.00		na
	62																											19.38	19.53	3.13	22.81	0.00	0.00		na
7/26/2000	63																											19.38	19.53	3.13	22.81	0.00	0.00	0.00	na
	64																											19.38	19.53	3.13	22.81	0.00	0.00		na
	65																											19.38	19.53	3.13	22.81	0.00	0.00		na
	68																											19.38	19.53	3.13	22.81	0.00	0.00		na
	69																				- 1							19.38	19.53	3.13	22.81	0.00	0.00		na
	71																				- 1							20.00	28.13 28.13	3.75 3.75	26.52	0.00	0.00		na
	75 76																											20.00 21.88	28.13 38.28	4.38	26.52 28.28	0.00	0.00		na na
	77																											21.88	38.28	4.38	28.28	0.00	0.00		na
	78																				- 1							21.88	38.28	4.38	28.28	0.00	0.00		na
	79																				- 1							21.88	38.28	4.38	28.28	0.00	0.00		na
	82																				- 1							21.88	38.28	4.38	28.28	0.00	0.00		na
	83																				- 1							22.50	50.00	5.00	31.43	0.00	0.00		na
	84																				- 1							22.50	50.00	5.00	31.43	2.50	0.00		0.00
	85																				- 1							22.50	50.00	5.00	31.43	2.50	0.00		0.00
	86																				- 1							22.50	50.00	5.00	31.43	2.50	0.00		0.00
	89																				- 1							23.13	38.28	4.38	26.76	2.50	0.00		0.00
	90 91																				- 1							23.13 23.75	38.28 28.13	4.38 3.75	26.76 22.33	2.50 3.75	0.00 3.13		0.00 47.14
	92																											23.75	28.13	3.75	22.33	3.75	3.13		47.14 47.14
	93																											23.75	28.13	3.75	22.33	3.75	3.13		47.14
	96																				- 1							25.00	28.13	3.75	21.21	5.63	7.03	1.88 4	
	109																				- 1							43.75	3.13	1.25	4.04	5.63	7.03		47.14
	110																											43.75	3.13	1.25	4.04	5.63	7.03		47.14
	111																											43.75	3.13	1.25	4.04	5.63	7.03		47.14
9/13/2000	112																											43.75	3.13	1.25	4.04	5.63	7.03	1.88 4	47.14
9/14/2000	113																											43.75	3.13	1.25	4.04	5.63	7.03	1.88 4	7.14

HOUSATONIC RIVER PROJECT CROSSOVER *RANA pipiens* DEVELOPMENTAL STUDY 2000 METAMORPH DATA R3 REFERENCE LARVAE IN DECHLORINATED (Aged) TAP WATER

FINAL METAMORPH DATA OF ADDITIONAL REFERENCE SPECIMENS CULTURED IN DECHLORINATED TAP WATER

С	omposited EM01/EM0	2-1	С	omposited EM01/EM0	2-2	C	omposited EM01/EM0	2-3	Co	mposited EM01/EM0	2-4		CUMULATIVE METAN	MORPH STATISTICS	3
Total	Number	%	Total	Number	%	Total	Number	%	Total	Number	%				
Number	Metamorphed	Metamorphed	Number	Metamorphed	Metamorphed	Number	Metamorphed	Metamorphed	Number	Metamorphed	Metamorphed	MEAN %	VAR (S2)	SEM	CV (%)
·															
40	20	50.00	40	28	70.00	40	31	77.50	40	21	52.50	62.50	179.17	6.69	21.42

HOUSATONIC RIVER PROJECT CROSSOVER RANA pipiens DEVELOPMENTAL STUDY 2000 STAGE/MALFORMATION DATA DATA SUMMARY

% MALFORMED BY SITE AND STUDY DAY

	R1 Ref. Larvae in S	ite W-8 (120.0 mg/Kg Se	ed. PCB), 91 Days*	
DAY	STAGE	% MAL.	SEM	EVENT
0	20	0.00	0.00	1
10	22	22.78	4.55	2
17	23	28.83	3.44	3
22	23	20.28	3.86	4
35	24	22.78	4.55	5
57	24	22.78	6.11	6
63	28	25.28	4.72	7
91	28	12.78	2.42	8
Grand Means:		19.06	4.35	

		ite W-8 (120.0 mg/Kg S	ed. PCB), 76 Days*	
DAY	STAGE	% MAL	SEM	EVENT
0	20	0.00	0.00	1
7	21	18.75	1.25	2
20	24	26.25	2.39	3
42	25	22.50	3.23	4
48	27	28.75	1.25	5
76	32	22.50	4.33	6
Grand Means:		19.79	6.00	
Grand Means:		19.79	6.00	

REFERENCE SITE DATA SHARED WITH DEVELOPMENTAL STUDY

	R3 Ref. Larvae in Re	f. Site MP (0.04 mg/Kg	Sed. PCB), 76 Days*	
DAY	STAGE	% MAL.	SEM	EVENT
0	20	0.00	0.00	1
7	23	0.00	0.00	2
20	25	0.00	0.00	3
42	29	1.25	0.00	4
48	30	16.88	13.13	5
76	38	2.50	2.50	6
Grand Means:		3.44	2.35	
Grana Mouris.		VT-T	2.30	

^{*}Test duration.

HOUSATONIC RIVER PROJECT CROSSOVER *RANA pipiens* DEVELOPMENTAL STUDY 2000 STAGE/MALFORMATION DATA R1 EXTERNAL REFERENCE LARVAE IN SITE 33 (W-8), 120.0 mg/Kg SEDIMENT PCB

STAGE 20, 5/9/2000, DAY 0

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				1	YPE OF I	MALFORM	ATION (E	ELTS OBS	ERVED)			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1 EM01-2 EM01-3 EM01-4	10 10 9 10	10 10 9 10	0 0 0 0	0.00 0.00 0.00 0.00												
Total:	39	39	0		0	0	0	0	0	0	0	0	0	0	0	0
Means: Var (S2) SEM CV (%)				0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na

STAGE 22, 5/19/2000, DAY 10

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%					TYPE OF I	MALFORM.	ATION (D	ELTS OBSE	RVED)			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1 EM01-2 EM01-3 EM01-4	10 10 9 10	10 10 9 10	3 3 1 2	30.00 30.00 11.11 20.00	2 3 1	3 2 2			1 1 1							
Total:	39	39	9		6	7	0	0	4	0	0	0	0	0	0	0
Means (based or Var (S2) SEM CV (%)	n initial larval cou	unt):		22.78 82.72 4.55 39.93	15.00 1.00 0.58 6.67	17.50 0.33 0.33 3.30	0.00 na na na	0.00 na na na	10.28 0.00 0.00 0.00	0.00 na na na	0.00 na na na	0.00 na na na	0.00 na na na	0.00 na na na	0.00 na na na	0.00 na na na

STAGE 23, 5/26/2000, DAY 17

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%					TYPE OF N	MAI FORM	ATION (D	ELTS OBSE	RVFD)			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	10	10	3	30.00	2	3			1		1	1				
EM01-2	10	10	2	20.00	2	2			2		1	1				
EM01-3	9	7	3	33.33	1	3			3			1		1		
EM01-4	10	10	2	20.00	1	2			2			1		2	1	
Total:	39	37	10		6	10	0	0	8	0	2	4	0	3	1	0
Means (based or	n initial larval cou	int):		25.83	15.28	25.83	0.00	0.00	20.83	0.00	5.00	10.28	0.00	7.78	2.50	0.00
Var (S2)		,		47.22	0.33	0.33	na	na	0.67	na	0.00	0.00	na	0.50	na	na
SEM				3.44	0.29	0.29	na	na	0.41	na	0.00	0.00	na	0.50	na	na
CV (%)				26.60	3.78	2.23	na	na	3.92	na	0.00	0.00	na	9.09	na	na

STAGE 23, 5/31/2000, DAY 22

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				T	YPE OF N	//ALFORM	ATION (D	ELTS OBSI	ERVED)			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	10	10	3	30.00	2	3	3		2		1	1		1		
EM01-2 EM01-3	10 9	10 5	1	20.00 11.11	1	1	2		1			1		2		
EM01-4	10	9	2	20.00	2	2			1					1		
Total:	39	34	8		7	8	5	0	4	0	1	2	0	4	0	0
Means (based on	initial larval cou	ınt):		20.28	17.78	20.28	12.50	0.00	10.00	0.00	2.50	5.00	0.00	10.00	0.00	0.00
Var (S2)				59.57	0.25	0.67	0.50	na	0.33	na	na	0.00	na	0.33	na	na
SEM				3.86	0.25	0.41	0.50	na	0.33	na	na	0.00	na	0.33	na	na
CV (%)				38.06	2.81	4.03	5.66	na	5.77	na	na	0.00	na	5.77	na	na

HOUSATONIC RIVER PROJECT CROSSOVER *RANA pipiens* DEVELOPMENTAL STUDY 2000 STAGE/MALFORMATION DATA R1 EXTERNAL REFERENCE LARVAE IN SITE 33 (W-8), 120.0 mg/Kg SEDIMENT PCB

STAGE 24, 6/13/2000, DAY 35

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				1	TYPE OF N	MALFORM	ATION (D	ELTS OBS	ERVED)			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1 EM01-2 EM01-3 EM01-4	10 10 9 10	7 8 5	3 2 1 3	30.00 20.00 11.11 30.00		3 2 1	1 2 1		2 1 1		2	2 2 1				
Total:	39	27	9	30.00	0	8	6	0	4	0	3	6	0	0	0	0
Means (based on Var (S2) SEM CV (%)	initial larval cou	int):		22.78 82.72 4.55 39.93	0.00 na na na	20.28 0.67 0.41 4.03	15.28 0.33 0.29 3.78	0.00 na na na	10.28 0.33 0.33 5.62	0.00 na na na	7.50 0.50 0.50 9.43	15.28 0.33 0.29 3.78	0.00 na na na	0.00 na na na	0.00 na na na	0.00 na na na

STAGE 24, 7/5/2000, DAY 57

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				1	YPE OF N	MALFORM	ATION (D	ELTS OBS	ERVED)			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	10	7	2	20.00		2	2		1			1				
EM01-2	10	8	4	40.00	1	3	1	1	4		2	2				
EM01-3	9	5	1	11.11	1	1					1	1				
EM01-4	10	7	2	20.00	2	2					1	2				
Total:	39	27	9		4	8	3	1	5	0	4	6	0	0	0	0
Means (based on	initial larval cou	int):		22.78	10.28	20.28	7.50	2.50	12.50	0.00	10.28	15.28	0.00	0.00	0.00	0.00
Var (S2)				149.38	0.33	0.67	0.50	na	4.50	na	0.33	0.33	na	na	na	na
SEM				6.11	0.33	0.41	0.50	na	1.50	na	0.33	0.29	na	na	na	na
CV (%)				53.66	5.62	4.03	9.43	na	16.97	na	5.62	3.78	na	na	na	na

STAGE 28, 7/11/2000, DAY 63

SAMPLE ID	INITIAL No. LARVAE at DAY 0	No. of LARVAE LIVING	NUMBER MALFORMED	% MAL.	EDEMA	TAIL	NOTOCHORD	FIN	TYPE OF N	MALFORM BRAIN	ATION (D	ELTS OBSI	ERVED)	HEMORRHAGE	CARDIAC	STUNTED
ID	at DAT U	LIVING	WALFURWED	WAL.	EDEIVIA	IAIL	NOTOCHORD	FIIN	FACE	BRAIN	ETE	MOUTH	GUI	HEINORKHAGE	CARDIAC	STUNTED
EM01-1 EM01-2	10 10	7 8	3	30.00 30.00		3	2 2	1 2	1 2	1		2 3		2 1		
EM01-3	9	5	1	11.11		1	1		1							
EM01-4	10	7	3	30.00		3	3		2			2		2		
Total:	39	27	10		0	10	8	3	6	1	0	7	0	5	0	0
Means (based on Var (S2) SEM CV (%)	ı initial larval cou	int):		25.28 89.20 4.72 37.36	0.00 na na na	25.28 1.00 0.50 3.96	20.28 0.67 0.41 4.03	7.50 0.50 0.50 9.43	15.28 0.33 0.29 3.78	2.50 na na na	0.00 na na na	17.50 0.33 0.33 3.30	0.00 na na na	12.50 0.33 0.33 4.62	0.00 na na na	0.00 na na na

STAGE 28, 8/8/2000, DAY 91

	SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				,	TYPE OF N	MALFORM	ATION (D	ELTS OBS	ERVED)			
_	ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
	EM01-1	10	4	1	10.00	1	1			1							
	EM01-2	10	7	2	20.00	1	2			2			1				
	EM01-3	9	4	1	11.11		1			1			1				
	EM01-4	10	4	1	10.00		1			1			1				
	Total:	39	19	5		2	5	0	0	5	0	0	3	0	0	0	0
	Means (based or	n initial larval cou	ınt):		12.78	5.00	12.78	0.00	0.00	12.78	0.00	0.00	7.78	0.00	0.00	0.00	0.00
	Var (S2)				23.46	0.00	0.25	na	na	0.25	na	na	0.00	na	na	na	na
	SEM				2.42	0.00	0.25	na	na	0.25	na	na	0.00	na	na	na	na
	CV (%)				37.90	0.00	3.91	na	na	3.91	na	na	0.00	na	na	na	na

HOUSATONIC RIVER PROJECT CROSSOVER *RANA pipiens* DEVELOPMENTAL STUDY 2000 STAGE/MALFORMATION DATA R1 EXTERNAL REFERENCE LARVAE IN SITE 33 (W-8), 120.0 mg/Kg SEDIMENT PCB

GRAND MEANS OF COMBINED LARVAL MALFORMATION DATA

	NUMBER	%				1	TYPE OF N	IALFORM	ATION (D	ELTS OBSE	RVED)				
ı	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED	
G	Grand Means:	19.06	7.92	17.78	6.94	1.25	11.49	0.31	3.16	8.89	0.00	3.78	0.31	0.00	
	SEM	4.35	3.80	4.14	4.10	1.34	2.94	0.44	2.01	3.44	0.00	2.69	0.44	0.00	

HOUSATONIC RIVER PROJECT CROSSOVER RANA pipiens DEVELOPMENTAL STUDY 2000 STAGE/MALFORMATION DATA R3 EXTERNAL REFERENCE LARVAE IN SITE 33 (W-8), 120.0 mg/Kg SEDIMENT PCB

STAGE 20, 5/24/2000, DAY 0

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	ALFORM	ATION (D	ELTS OBS	ERVED)			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1 EM01-2 EM01-3 EM01-4	20 20 20 20	20 20 20 20	0 0 0	0.00 0.00 0.00 0.00												
Total:	80	80	0		0	0	0	0	0	0	0	0	0	0	0	0
Means: Var (S2) SEM CV (%)				0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na

STAGE 21, 5/31/2000, DAY 7

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	ALFORMA	ATION (D	ELTS OBS	ERVED)			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1 EM01-2 EM01-3 EM01-4	20 20 20 20	20 18 18 19	4 4 4 3	20.00 20.00 20.00 15.00	2 2 2 1	3 2 4 3			2 3 1 3		2	1 1 2	1 3 3 2			
Total:	80	75	15		7	12	0	0	9	0	3	4	9	0	0	0
Means (based o Var (S2) SEM CV (%)	n initial larval co	ount):		18.75 6.25 1.25 13.33	8.75 0.25 0.25 5.71	15.00 0.67 0.41 5.44	0.00 na na na	0.00 na na na	11.25 0.92 0.48 8.51	0.00 na na na	3.75 0.50 0.50 18.86	5.00 0.33 0.33 11.55	11.25 0.92 0.48 8.51	0.00 na na na	0.00 na na na	0.00 na na na

STAGE 24, 6/13/2000, DAY 20

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	ALFORMA	ATION (D	ELTS OBS	ERVED)			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	20	17	6	30.00		6	6		5		1	5				
EM01-2	20	18	4	20.00		4	4		3			4			1	
EM01-3	20	18	6	30.00		6	5		5	2		6			1	
EM01-4	20	19	5	25.00		5	4		1		2	4		1		
Total:	80	72	21		0	21	19	0	14	2	3	19	0	1	2	0
Means (based or	n initial larval co	ount):		26.25	0.00	26.25	23.75	0.00	17.50	2.50	3.75	23.75	0.00	1.25	2.50	0.00
Var (S2)				22.92	na	0.92	0.92	na	3.67	na	0.50	0.92	na	na	0.00	na
SEM				2.39	na	0.48	0.48	na	0.96	na	0.50	0.48	na	na	0.00	na
CV (%)				18.24	na	3.65	4.03	na	10.94	na	18.86	4.03	na	na	0.00	na

STAGE 25, 7/5/2000, DAY 42

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	ALFORMA	ATION (E	ELTS OBS	ERVED)	ı		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	20	16	3	15.00	1	3			3		1	3	1			
EM01-2	20	17	6	30.00	1	5			3			2	2		1	
EM01-3	20	18	4	20.00	1	4			1			1		1	4	
EM01-4	20	19	5	25.00	2	5			1			3			4	
Total:	80	70	18		5	17	0	0	8	0	1	9	3	1	9	0
Means (based	on initial larval co	ount):		22.50	6.25	21.25	0.00	0.00	10.00	0.00	1.25	11.25	3.75	1.25	11.25	0.00
Var (S2)				41.67	0.25	0.92	na	na	1.33	na	na	0.92	0.50	na	3.00	na
SEM				3.23	0.25	0.48	na	na	0.58	na	na	0.48	0.50	na	1.00	na
CV (%)				28.69	8.00	4.51	na	na	11.55	na	na	8.51	18.86	na	15.40	na

HOUSATONIC RIVER PROJECT CROSSOVER RANA pipiens DEVELOPMENTAL STUDY 2000 STAGE/MALFORMATION DATA R3 EXTERNAL REFERENCE LARVAE IN SITE 33 (W-8), 120.0 mg/Kg SEDIMENT PCB

STAGE 27, 7/11/2000, DAY 48

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	ALFORMA	ATION (D	ELTS OBS	ERVED)		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1 EM01-2 EM01-3 EM01-4	20 20 20 20	16 17 18 19	6 5 6 6	30.00 25.00 30.00 30.00		6 5 6 5	6 4 6 5		1		6	3 4 3 4	2	2		
Total:	80	70	23		0	22	21	0	1	0	9	14	2	2	0	0
Means (based o Var (S2) SEM CV (%)	n initial larval co	ount):		28.75 6.25 1.25 8.70	0.00 na na na	27.50 0.33 0.29 2.10	26.25 0.92 0.48 3.65	0.00 na na na	1.25 na na na	0.00 na na na	11.25 4.50 1.50 18.86	17.50 0.33 0.29 3.30	2.50 na na na	2.50 na na na	0.00 na na na	0.00 na na na

STAGE 32, 8/8/2000, DAY 76

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	ALFORM	ATION (D	ELTS OBS	ERVED)			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1 EM01-2 EM01-3 EM01-4	20 20 20 20	16 17 18 19	6 5 2 5	30.00 25.00 10.00 25.00	1	6 5 2 4		2 3 1 4	4		1 3 2 2	4 2 1 3	1			
Total:	80	70	18		1	17	0	10	4	0	8	10	1	0	0	0
Means (based o Var (S2) SEM CV (%)	n initial larval co	ount):		22.50 75.00 4.33 38.49	1.25 na na na	21.25 2.92 0.85 8.04	0.00 na na na	12.50 1.67 0.65 10.33	5.00 na na na	0.00 na na na	10.00 0.67 0.41 8.16	12.50 1.67 0.65 10.33	1.25 na na na	0.00 na na na	0.00 na na na	0.00 na na na

GRAND MEANS OF COMBINED LARVAL MALFORMATION DATA

NUMBER	%	TYPE OF MALFORMATION (DELTS OBSERVED)											
MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
Grand Means:	19.79	2.71	18.54	8.33	2.08	7.50	0.42	5.00	11.67	3.13	0.83	2.29	0.00
SEM	6.00	1.82	5.79	6.11	2.36	3.35	0.47	2.31	4.46	2.02	0.49	2.10	0.00

HOUSATONIC RIVER PROJECT CROSSOVER *RAMA pipiens* DEVELOPMENTAL STUDY 2000 STAGE/MALFORMATION DATA R3 EXTERNAL REFERENCE LARVAE IN REFERENCE SITE 40 (MP), 0.04 mg/Kg SEDIMENT PCB

STAGE 20, 5/24/2000, DAY 0

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	ALFORMA	ATION (D	ELTS OBS	ERVED)			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	20	20	0	0.00												
EM01-2	20	20	Ö	0.00												
EM01-3	20	20	Ö	0.00												
EM01-4	20	20	Ö	0.00												
LINIOT	20	20	Ü	0.00												
Total:	80	80	0		0	0	0	0	0	0	0	0	0	0	0	0
Means:				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EM02-1	20	20	0	0.00												
EM02-2	20	20	0	0.00												
EM02-3	20	20	0	0.00												
EM02-4	20	20	0	0.00												
Total:	80	80	0		0	0	0	0	0	0	0	0	0	0	0	0
Means:				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grand Means: Var (S2) SEM CV (%)				0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na	0.00 0.00 0.00 na

STAGE 23, 5/31/2000, DAY 7

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				τv	PE OF M	AI FORMA	ATION (F	ELTS OBSI	FRVFD)			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	20	20	0	0.00												
EM01-2	20	18	0	0.00												
EM01-3	20	17	0	0.00												
EM01-4	20	17	0	0.00												
Total:	80	72	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based or	n initial larval co	ount):	Means:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EM02-1	20	16	0	0.00												
EM02-2	20	18	0	0.00												
EM02-3	20	17	0	0.00												
EM02-4	20	19	0	0.00												
Total:	80	70	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based or	n initial larval co	ount):	Means:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grand Means:				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Var (S2)				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEM				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CV (%)				na	na	na	na	na	na	na	na	na	na	na	na	na

HOUSATONIC RIVER PROJECT CROSSOVER RANA pipiens DEVELOPMENTAL STUDY 2000 STAGE/MALFORMATION DATA R3 EXTERNAL REFERENCE LARVAE IN REFERENCE SITE 40 (MP), 0.04 mg/Kg SEDIMENT PCB

STAGE 25, 6/13/2000, DAY 20

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	ALFORMA	ATION (E	ELTS OBS	ERVED)			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	00	00		0.00												
	20	20	0	0.00												
EM01-2	20	17	0	0.00												
EM01-3	20	17	0	0.00												
EM01-4	20	17	0	0.00												
Total:	80	71	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based or	n initial larval co	ount):		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EM02-1	20	15	0	0.00												
EM02-2	20	18	0	0.00												
EM02-3	20	17	0	0.00												
EM02-4	20	19	0	0.00												
Total:	80	69	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based or	n initial larval co	ount):		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grand Means:				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Var (S2)				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEM				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CV (%)				na	na	na	na	na	na	na	na	na	na	na	na	na

STAGE 29, 7/5/2000, DAY 42

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	ALFORMA	ATION (E	ELTS OBS	ERVED))		
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	20	20	0	0.00												
EM01-2	20	16	Ö	0.00												
EM01-3	20	17	Ö	0.00												
EM01-4	20	16	1	5.00		1										
Total:	80	69	1		0	1	0	0	0	0	0	0	0	0	0	0
Means (based or	n initial larval co	ount):		1.25	0.00	1.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EM02-1	20	15	0	0.00												
EM02-2	20	18	0	0.00												
EM02-3	20	17	1	5.00		1	1									
EM02-4	20	18	0	0.00												
Total:	80	68	1		0	1	1	0	0	0	0	0	0	0	0	0
Means (based or	n initial larval co	ount):		1.25	0.00	1.25	1.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grand Means:				1.25	0.00	1.25	0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Var (S2)				0.00	0.00	0.00	0.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEM				0.00	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CV (%)				0.00	na	0.00	141.42	na	na	na	na	na	na	na	na	na

HOUSATONIC RIVER PROJECT CROSSOVER *RANA pipiens* DEVELOPMENTAL STUDY 2000 STAGE/MALFORMATION DATA R3 EXTERNAL REFERENCE LARVAE IN REFERENCE SITE 40 (MP), 0.04 mg/Kg SEDIMENT PCB

STAGE 30, 7/11/2000, DAY 48

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				TY	PE OF M	ALFORMA	ATION (D	ELTS OBS	ERVED)			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	20	20	0	0.00												
EM01-2	20	16	1	5.00		1	1									
EM01-3	20	17	2	10.00		2	2									
EM01-4	20	16	0	0.00		-	-									
Total:	80	69	3		0	3	3	0	0	0	0	0	0	0	0	0
Means (based or	n initial larval co	ount):		3.75	0.00	3.75	3.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EM02-1	20	15	5	25.00		5	4		2			3		1		
EM02-2	20	18	5	25.00		5	5	3	4			5				
EM02-3	20	17	6	30.00		5	4	1	4			5		1		1
EM02-4	20	18	8	40.00		8	7	4	6	1		7		2		
Total:	80	68	24		0	23	20	8	16	1	0	20	0	4	0	1
Means (based or	n initial larval co	ount):		30.00	0.00	28.75	25.00	10.00	20.00	1.25	0.00	25.00	0.00	5.00	0.00	1.25
Grand Means: Var (S2) SEM CV (%)				16.88 344.53 13.13 109.99	0.00 0.00 0.00 na	16.25 312.50 12.50 108.79	14.38 225.78 10.63 104.53	5.00 50.00 5.00 141.42	10.00 200.00 10.00 141.42	0.63 0.78 0.63 141.42	0.00 0.00 0.00 na	12.50 312.50 12.50 141.42	0.00 0.00 0.00 na	2.50 12.50 2.50 141.42	0.00 0.00 0.00 na	0.63 0.78 0.63 141.42

STAGE 38, 8/8/2000, DAY 76

SAMPLE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%				T	/DE OE M	IAI EODM	ATION (F	ELTS OBS	EDVEN)			
ID	at DAY 0	LIVING	MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
EM01-1	20	13	1	5.00		1										
EM01-2	20	15	1	5.00		1										
EM01-3	20	15	1	5.00		1			1							
EM01-4	20	16	1	5.00		1	1		1							
Total:	80	59	4		0	4	1	0	2	0	0	0	0	0	0	0
Means (based o	n initial larval co	ount):		5.00	0.00	5.00	1.25	0.00	2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EM02-1	20	15	0	0.00												
EM02-2	20	18	0	0.00												
EM02-3	20	16	0	0.00												
EM02-4	20	17	0	0.00												
Total:	80	66	0		0	0	0	0	0	0	0	0	0	0	0	0
Means (based o	n initial larval co	ount):		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grand Means:				2.50	0.00	2.50	0.63	0.00	1.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Var (S2)				12.50	0.00	12.50	0.78	0.00	3.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEM				2.50	0.00	2.50	0.63	0.00	1.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CV (%)				141.42	na	141.42	141.42	na	141.42	na	na	na	na	na	na	na

GRAND MEANS OF COMBINED LARVAL MALFORMATION DATA

NUMBER	%	TYPE OF MALFORMATION (DELTS OBSERVED)											
MALFORMED	MAL.	EDEMA	TAIL	NOTOCHORD	FIN	FACE	BRAIN	EYE	MOUTH	GUT	HEMORRHAGE	CARDIAC	STUNTED
Grand Means:	3.44	0.00	3.33	2.60	0.83	1.88	0.10	0.00	2.08	0.00	0.42	0.00	0.10
SEM	2.35	0.00	2.26	2.04	0.72	1.42	0.09	0.00	1.80	0.00	0.36	0.00	0.09

HOUSATONIC RIVER PROJECT CROSSOVER RANA pipiens DEVELOPMENTAL STUDY 2000 GROWTH DATA SUMMARY

R1 Ref Larvae in Site W-8 (120.0 mg/kg Sed PCB) Reps=4, 91 Days*										
STUDY Day	DEVELOPMENTAL STAGE	MEAN GROWTH (cm)	SEM							
0	20	1.216	0.023							
10	22	1.858	0.014							
17	23	2.021	0.066							
22	23	1.901	0.031							
35	24	2.570	0.058							
57	24	3.758	0.129							
63	28	4.034	0.115							
91	28	4.059	0.128							

STUDY	DEVELOPMENTAL	AL MEAN GROWTH						
DAY	STAGE	(cm)	SEM					
0	20	1.029	0.004					
7	21	1.497	0.031					
20	24	2.420	0.024					
42	25	3.710	0.088					
48	27	3.884	0.123					
76	32	4.397	0.025					

REFERENCE SITE DATA SHARED WITH DEVELOPMENTAL STUDY R3 LARVAE IN SITE 40 WATER/SEDIMENT

R3 Ref Larvae in Ref Site MP (0.04 mg/kg Sed PCB) Reps=8, 76 Days*									
STUDY	DEVELOPMENTAL	MEAN GROWTH							
DAY	STAGE	(cm)	SEM						
0	20	1.018	0.010						
7	23	1.488	0.022						
20	25	2.311	0.073						
42	29	3.579	0.028						
48	30	3.803	0.029						
76	38	4.383	0.048						

^{*}Test Duration.

_	EM01-1	EM01-2	EM01-3	EM01-4
	1.301	1.301	1.120	1.286
DATE	1.226	1.183	1.165	1.233
05/09/00	1.149	1.333	1.239	1.257
	1.120	1.382	1.120	1.392
STUDY DAY	1.201	1.213	1.253	1.276
0	1.339	1.268	1.157	1.156
	1.171	1.095	1.081	1.321
STAGE	1.200	1.174	1.200	1.229
20	1.284	1.088	1.114	1.215
	1.099	1.171		1.380

Individual Statistics						
N	10	10	9	10		
Mean	1.209	1.221	1.161	1.275		
Var. (S²)	0.006	0.010	0.004	0.005		
SEM	0.025	0.031	0.020	0.023		
Site Average						
Total N	39					
Site Mean	1.216					
Var. (S ²) SEM	0.002 0.023					

	EM01-1	EM01-2	EM01-3	EM01-4
	1.958	1.625	1.810	1.730
DATE	2.194	1.488	1.920	2.162
05/19/00	1.829	1.676	2.022	1.979
	1.538	1.851	1.986	1.730
STUDY DAY	1.675	1.636	1.940	1.760
10	1.996	1.874	1.942	1.651
	1.984	1.963	1.446	1.913
STAGE	1.640	1.879	1.899	1.944
22	1.721	1.691	2.036	1.754
	2.042	2.547		2.004

Individual Sta	atistics			
N	10	10	9	10
Mean	1.858	1.823	1.889	1.863
Var. (S ²)	0.044	0.086	0.032	0.026
SEM	0.066	0.093	0.060	0.051
Site Average				
Total N	39			
Site Mean	1.858			
Var. (S ²) SEM	0.001 0.014			

_	EM01-1	EM01-2	EM01-3	EM01-4
	1.815	2.129	2.018	2.005
DATE	2.162	2.077	2.115	2.138
05/26/00	2.341	2.018	1.855	2.015
	2.137	1.972	1.959	2.045
STUDY DAY	2.144	2.519	1.545	1.708
17	2.044	2.176	1.844	2.335
	2.463	1.727	1.701	2.140
STAGE	2.241	1.863		1.895
23	2.099	2.014		2.023
	2.386	1.887		1.694

Individual Statistics						
N	10	10	7	10		
Mean	2.183	2.038	1.862	2.000		
Var. (S²)	0.035	0.046	0.037	0.038		
SEM	0.059	0.068	0.073	0.062		
Site Average						
Total N	37					
Site Mean	2.021					
Var. (S²) SEM	0.017 0.066					
SEIVI	0.000					

	EM01-1	EM01-2	EM01-3	EM01-4
	2.033	2.129	2.098	1.903
DATE	2.118	1.841	1.857	1.674
05/31/00	1.608	1.905	2.062	1.938
	1.984	1.831	1.953	1.813
STUDY DAY	1.946	1.778	1.964	1.664
22	1.688	1.703		2.311
	1.840	1.935		1.757
STAGE	1.523	2.151		1.954
23	1.840	1.945		1.779
	1.890	1.831		

Individual Statistics					
N	10	10	5	9	
Mean	1.847	1.905	1.987	1.866	
Var. (S²)	0.036	0.021	0.009	0.039	
SEM	0.060	0.045	0.043	0.066	
Site Average					
Total N	34				
Site Mean	1.901				
Var. (S²) SEM	0.004 0.031				

_	EM01-1	EM01-2	EM01-3	EM01-4
_				
	2.570	1.842	2.392	2.481
DATE	2.392	2.272	2.322	2.534
06/13/00	2.627	2.852	3.324	2.444
	3.288	2.281	2.799	2.403
STUDY DAY	2.400	2.514	2.810	2.358
35	2.012	2.615		3.284
	2.384	2.629		2.511
STAGE		2.631		
24				

Individual Statistics						
N	7	8	5	7		
Mean	2.525	2.455	2.729	2.574		
Var. (S ²)	0.152	0.098	0.161	0.102		
SEM	0.147	0.111	0.180	0.121		
Site Average						
Total N	27					
Site Mean	2.570					
Var. (S²) SEM	0.014 0.058					

_	EM01-1	EM01-2	EM01-3	EM01-4
	4.040	4.284	3.843	5.530
DATE	3.679	4.500	3.345	2.730
07/05/00	3.551	3.260	5.089	4.114
	3.209	3.627	4.369	3.091
STUDY DAY	2.521	3.168	3.386	5.015
57	3.418	3.816		3.231
	3.382	4.306		2.663
STAGE		3.895		
24				

Individual Statistics						
N	7	8	5	7		
Mean	3.400	3.857	4.006	3.768		
Var. (S²)	0.220	0.240	0.538	1.304		
SEM	0.177	0.173	0.328	0.432		
Site Average						
Total N	27					
Site Mean	3.758					
Var. (S ²) SEM	0.067 0.129					

	EM01-1	EM01-2	EM01-3	EM01-4
_				_
	3.885	4.245	3.667	6.348
DATE	3.890	3.965	4.528	2.802
07/11/00	3.312	3.948	3.825	3.010
	3.337	3.972	5.043	4.740
STUDY DAY	3.485	3.901	4.533	3.261
63	4.176	4.900		5.140
	4.300	3.767		3.316
STAGE		2.967		
28				

Individual Statistics						
N	7	8	5	7		
Mean	3.769	3.958	4.319	4.088		
Var. (S²)	0.158	0.285	0.321	1.789		
SEM	0.150	0.189	0.253	0.506		
0:1- 4						
Site Average						
Total N	27					
Site Mean	4.034					
Var. (S²)	0.053					
SEM	0.115					

	EM01-1	EM01-2	EM01-3	EM01-4
_				_
	4.043	3.706	4.295	5.684
DATE	3.289	3.681	3.873	4.041
08/08/00	5.283	5.189	4.434	4.362
	3.610	4.510	2.414	3.430
STUDY DAY		3.453		
91		3.449		
		4.331		
STAGE				
28				

Individual Statistics						
N	4	7	4	4		
Mean	4.056	4.045	3.754	4.379		
Var. (S²)	0.764	0.427	0.855	0.906		
SEM	0.437	0.247	0.462	0.476		
Site Average	40					
Total N	19					
Site Mean	4.059					
Var. (S²) SEM	0.065 0.128					

_	EM01-1	EM01-2	EM01-3	EM01-4
	1.134	0.950	1.118	1.206
DATE	1.142	1.025	0.901	1.014
05/24/00	1.048	1.084	0.886	1.156
	1.041	1.034	1.145	0.900
STUDY DAY	0.833	1.083	1.003	1.000
0	0.756	1.050	1.072	0.974
	0.923	1.021	1.072	1.175
STAGE	1.101	1.028	0.925	1.171
20	1.010	0.865	1.052	1.085
	1.116	1.014	1.011	1.063
	0.993	1.025	1.033	1.106
	1.106	0.956	0.946	1.073
	1.082	0.958	1.291	1.020
	1.059	1.024	1.010	1.059
	1.061	1.117	1.031	0.932
	1.081	1.091	0.958	0.983
	1.019	1.043	1.058	1.019
	1.011	1.054	1.065	0.895
	0.963	0.982	0.982	0.920
	1.087	0.973	1.017	1.028

Individual Statistics						
N	20	20	20	20		
Mean	1.028	1.019	1.029	1.039		
Var. (S²)	0.010	0.003	0.008	0.009		
SEM	0.022	0.013	0.021	0.021		
011						
Site Average						
Total N	80					
Site Mean	1.029					
Var. (S²)	0.000					
SEM	0.004					

_	EM01-1	EM01-2	EM01-3	EM01-4
	1.418	1.426	1.572	1.468
DATE	1.460	1.667	1.589	1.521
05/31/00	1.496	1.671	1.490	1.639
	1.471	1.634	1.428	1.471
STUDY DAY	0.989	1.461	1.553	1.462
7	1.484	1.492	1.578	1.521
	1.401	1.393	1.380	1.683
STAGE	1.284	1.667	1.385	1.705
21	1.475	1.655	1.468	0.138
	1.360	1.395	1.567	1.624
	1.395	1.594	1.675	1.514
	1.559	1.581	1.463	1.487
	1.341	1.701	1.460	1.580
	1.429	1.542	1.360	1.598
	1.351	1.393	1.502	1.631
	1.522	1.710	1.583	1.405
	1.527	1.602	1.679	1.384
	1.501	1.589	1.786	1.639
	1.528			1.462
	1.528			

Individual Stat	tistics			
N	20	18	18	19
Mean	1.426	1.565	1.529	1.470
Var. (S ²)	0.016	0.012	0.013	0.113
SEM	0.028	0.026	0.027	0.077
Site Average				
Total N	75			
Site Mean	1.497			
Var. (S²) SEM	0.004 0.031			

	EM01-1	EM01-2	EM01-3	EM01-4
_				
	2.413	2.970	2.534	2.962
DATE	2.888	2.419	2.159	2.818
06/13/00	2.839	2.629	2.379	2.136
	2.261	2.678	2.595	2.252
STUDY DAY	2.206	2.758	2.495	2.350
20	2.648	2.454	2.223	2.617
	2.314	2.455	2.199	2.190
STAGE	2.011	2.105	2.167	2.696
24	2.383	2.584	2.606	2.303
	2.452	2.255	2.251	2.629
	2.689	2.017	2.633	2.674
	2.678	2.389	2.619	2.367
	2.622	2.735	2.206	2.176
	2.601	2.296	2.212	2.393
	2.317	2.270	2.012	2.387
	2.307	2.089	2.456	2.414
	2.457	2.097	2.617	2.375
		2.180	2.091	2.001
				2.526

Individual Statistics						
N	17	18	18	19		
Mean	2.476	2.410	2.359	2.435		
Var. (S ²)	0.055	0.074	0.044	0.061		
SEM	0.057	0.064	0.050	0.057		
Site Average						
Total N	72					
Site Mean	2.420					
Var. (S²) SEM	0.002 0.024					

	EM01-1	EM01-2	EM01-3	EM01-4
_				
	2.901	4.298	3.177	3.693
DATE	3.844	4.861	3.569	3.544
07/05/00	3.598	4.275	3.569	3.995
	3.626	3.630	3.978	4.499
STUDY DAY	3.661	3.959	3.716	3.618
42	4.179	4.789	3.584	3.159
	3.491	3.370	3.419	2.995
STAGE	3.974	3.352	3.503	3.909
25	4.017	3.579	3.943	3.297
	4.211	3.563	3.548	3.436
	3.827	4.174	3.851	4.284
	3.122	3.673	3.850	3.817
	4.003	3.498	4.011	3.147
	3.889	4.149	3.689	3.790
	3.798	3.836	3.727	3.659
	3.486	4.461	3.767	3.788
		3.634	3.060	2.855
			3.250	3.138
				2.679

Individual Statistics						
N	16	17	18	19		
Mean	3.727	3.947	3.623	3.542		
Var. (S ²)	0.127	0.224	0.074	0.228		
SEM	0.089	0.115	0.064	0.109		
Site Average						
Total N	70					
Site Mean	3.710					
Var. (S²) SEM	0.031 0.088					

	EM01-1	EM01-2	EM01-3	EM01-4
_				_
	3.787	4.711	3.937	3.816
DATE	4.749	4.210	4.047	4.159
07/11/00	3.715	3.837	4.621	4.523
	3.389	3.754	3.434	4.176
STUDY DAY	4.779	4.544	3.136	3.091
48	4.087	4.263	3.750	3.771
	3.900	4.167	3.619	3.827
STAGE	4.503	4.271	3.630	4.437
27	4.129	3.688	3.849	3.138
	4.993	3.369	3.542	3.188
	4.135	3.686	4.023	4.030
	4.066	3.668	3.452	3.508
	4.059	4.227	3.740	3.151
	4.129	3.387	3.989	3.858
	4.123	4.868	4.152	3.780
	3.622	4.048	3.773	3.292
		4.070	3.452	3.074
			3.250	3.138
				2.679

Individual Stat	istics			
N	16	17	18	19
Mean	4.135	4.045	3.744	3.612
Var. (S²)	0.190	0.185	0.127	0.272
SEM	0.109	0.104	0.084	0.120
Cita Avarana				
Site Average				
Total N	70			
Site Mean	3.884			
Var. (S ²)	0.061			
SEM	0.123			

R3 REF. LARVAE IN SITE 33 (W-8), 120.0 mg/kg Sed. PCB

	EM01-1	EM01-2	EM01-3	EM01-4
_				
	3.001	4.850	4.265	4.658
DATE	4.564	5.526	4.048	5.604
08/08/00	4.186	4.323	4.337	4.835
	5.179	4.250	4.095	3.820
STUDY DAY	4.073	4.587	5.622	4.376
76	4.428	4.697	5.071	4.409
	4.782	5.159	3.452	4.981
STAGE	4.893	3.616	3.774	3.776
32	4.191	4.344	4.871	5.625
	4.702	4.392	4.715	4.688
	5.356	3.720	4.205	5.059
	3.936	3.873	3.613	3.269
	5.217	4.456	4.075	4.899
	3.052	5.399	4.695	3.965
	2.875	4.800	4.977	4.393
	5.504	3.130	4.134	3.808
		4.842	3.807	4.072
			4.649	3.806
				3.410

Individual Statistics											
N	16	17	18	19							
Mean	4.371	4.469	4.356	4.392							
Var. (S ²)	0.694	0.403	0.319	0.461							
SEM	0.208	0.154	0.133	0.156							
Site Average											
Total N	70										
Site Mean	4.397										
Var. (S²) SEM	0.003 0.025										

R3 (External Reference) LARVAE IN REFERENCE SITE 40 (MP) (0.04 mg/kg Sediment PCB Concentration) (Larvae maintained in FETAX solution until Site MP water was received on May 30, 2000)

_	EM01-1	EM01-2	EM01-3	EM01-4	EM02-1	EM02-2	EM02-3	EM02-4
	1.061	1.102	1.058	1.031	1.003	1.163	1.206	1.099
DATE	1.003	0.982	1.046	0.911	1.048	1.041	1.089	0.937
05/24/00	0.957	0.934	0.959	1.006	0.982	0.955	1.116	0.888
	1.041	1.007	1.170	0.669	0.945	1.101	1.102	1.037
STUDY DAY	0.896	0.934	1.061	0.972	0.967	1.058	1.187	1.011
0	1.002	1.028	1.111	1.007	1.019	1.050	1.024	1.025
	1.118	1.038	1.069	0.959	0.928	0.923	1.033	1.047
STAGE	0.832	0.982	1.139	0.917	1.047	1.047	1.046	0.872
20	0.950	0.979	1.093	0.982	1.040	0.845	0.834	1.006
	1.007	1.034	0.923	0.950	1.159	0.982	1.019	1.025
	0.986	0.958	1.010	0.944	1.072	0.925	1.033	0.943
	1.133	0.780	1.028	1.072	1.007	1.037	0.970	1.080
	1.002	1.096	1.021	1.081	1.046	1.117	1.022	0.865
	1.047	0.996	1.072	1.093	1.031	1.010	0.917	1.061
	0.937	0.806	1.011	1.096	1.047	1.195	0.923	0.972
	1.131	0.862	1.131	1.014	1.117	1.125	1.112	1.065
	1.093	1.059	1.007	1.028	1.010	0.982	0.959	0.979
	1.193	1.044	1.041	1.033	1.011	1.022	1.024	1.308
	1.087	0.972	1.155	0.985	1.031	1.140	1.046	1.028
	1.096	0.907	0.727	0.975	1.028	1.072	0.976	1.080

Individual Stati	etice							
N	20	20	20	20	20	20	20	20
Mean	1.029	0.975	1.042	0.986	1.027	1.039	1.032	1.016
Var. (S²)	0.008	0.007	0.009	0.009	0.003	0.008	0.008	0.010
SEM	0.020	0.019	0.022	0.021	0.012	0.020	0.020	0.022
EM01 Average				EM02 Average				
Total N	80			Total N	80			
Site Mean	1.008			Site Mean	1.029			
Var. (S ²)	0.001			Var. (S ²)	0.000			
SEM	0.016			SEM	0.005			
Site Average								
Total N	160							
Site Mean	1.018							
Var. (S ²)	0.000							
SEM	0.010							

R3 (External Reference) LARVAE IN REFERENCE SITE 40 (MP) (0.04 mg/kg Sediment PCB Concentration) (Larvae maintained in FETAX solution until Site MP water was received on May 30, 2000)

_	EM01-1	EM01-2	EM01-3	EM01-4	EM02-1	EM02-2	EM02-3	EM02-4
	1.247	1.478	1.514	1.621	2.140	1.399	1.605	1.556
DATE	1.354	1.438	1.328	1.258	1.735	1.373	1.529	1.468
05/31/00	1.185	1.436	1.489	1.363	1.690	1.380	1.575	1.486
	1.504	1.270	1.538	1.457	1.351	1.463	1.525	1.382
STUDY DAY	1.634	1.439	1.533	1.542	1.540	1.418	1.553	1.350
7	1.735	1.595	1.643	1.351	1.501	1.468	1.547	1.538
	1.866	1.456	1.675	1.379	1.488	1.360	1.586	1.645
STAGE	1.189	1.659	1.521	1.664	1.486	1.281	1.616	1.612
23	1.095	1.548	1.621	1.721	1.856	1.358	1.522	1.462
	1.378	1.496	1.646	1.581	1.496	1.389	1.693	1.607
	1.282	1.368	1.420	1.621	1.455	1.410	1.370	1.368
	1.515	1.325	1.247	1.547	1.517	1.537	1.595	1.190
	1.393	1.344	1.451	1.581	1.470	1.596	1.462	1.559
	1.351	1.522	1.498	1.498	1.622	1.373	1.546	1.547
	1.382	1.460	1.364	1.486	1.384	1.357	1.746	1.635
	1.337	1.372	1.506	1.701	1.585	1.330	1.245	1.525
	1.448	1.325	1.304	1.572		1.582	1.542	1.521
	1.475	1.154				1.422		1.594
	1.525							1.404
	1.529							

Individual Statis	tice							
N	20	18	17	17	16	18	17	19
Mean	1.421	1.427	1.488	1.526	1.582	1.416	1.545	1.497
Var. (S ²)	0.035	0.015	0.015	0.017	0.039	0.007	0.013	0.014
SEM	0.042	0.029	0.030	0.032	0.049	0.020	0.027	0.027
EM01 Average				EM02 Average				
Total N	72			Total N	70			
Site Mean	1.466			Site Mean	1.510			
Var. (S ²)	0.003			Var. (S ²)	0.005			
SEM	0.025			SEM	0.036			
Site Average								
Total N	142							
Site Mean	1.488							
Var. (S ²)	0.001							
SEM	0.022							

<u>_</u>	EM01-1	EM01-2	EM01-3	EM01-4	EM02-1	EM02-2	EM02-3	EM02-4
	4 000	0.050	0.444	0.007	0.004	0.054	0.005	0.500
	1.869	2.356	2.414	2.327	2.361	2.351	2.205	2.502
DATE	2.113	2.038	2.671	2.274	2.636	2.283	2.791	2.594
06/13/00	2.274	2.381	2.197	2.165	2.501	2.613	2.712	2.655
	2.100	2.186	2.371	2.287	2.660	2.472	2.812	3.117
STUDY DAY	2.227	2.360	2.404	2.469	2.542	2.434	2.509	2.400
20	2.287	2.339	2.954	2.670	2.517	2.735	2.192	2.347
	2.110	2.388	1.868	2.098	2.465	1.972	2.563	2.450
STAGE	2.238	1.996	2.142	2.367	2.659	2.238	2.450	2.222
25	2.215	1.998	1.823	2.194	2.360	2.256	2.297	2.182
	1.946	2.164	2.131	2.447	2.523	2.271	2.346	2.295
	2.290	2.246	2.186	2.367	2.232	2.555	2.492	2.212
	2.224	2.556	2.307	2.490	2.332	2.232	2.656	2.277
	1.980	2.408	2.351	1.968	2.596	2.367	2.550	2.133
	2.028	2.280	2.361	2.198	2.637	2.038	1.847	2.227
	2.150	2.239	2.384	1.674	2.592	2.153	1.913	1.946
	1.960	2.194	2.366	2.182		2.153	2.405	1.984
	1.864	2.473	2.014	2.257		2.612	2.273	2.053
	2.134					2.074		1.782
	2.112							2.200
	2.473							

N	20	17	17	17	15	18	17	19
Mean	2.130	2.271	2.291	2.261	2.507	2.323	2.413	2.294
Var. (S ²)	0.024	0.026	0.074	0.050	0.018	0.046	0.075	0.088
SEM	0.035	0.039	0.066	0.054	0.034	0.050	0.067	0.068
EM01 Average				EM02 Average				
Total N	71			Total N	69			
Site Mean	2.238			Site Mean	2.384			
Var. (S ²)	0.005			Var. (S ²)	0.009			
SEM	0.037			SEM	0.048			
Site Average								
Total N	140							
Site Mean	2.311							
Var. (S ²)	0.011							
SEM	0.073							

_	EM01-1	EM01-2	EM01-3	EM01-4	EM02-1	EM02-2	EM02-3	EM02-4
	3.920	3.273	3.207	5.102	2.818	3.427	3.048	3.489
DATE	3.189	4.271	3.148	3.373	2.982	3.887	3.218	3.224
07/05/00	4.199	3.393	2.812	3.349	3.699	3.976	2.879	3.248
	3.441	2.772	4.583	2.836	3.578	3.800	3.940	3.672
STUDY DAY	4.251	3.329	3.588	2.966	3.887	4.402	3.931	4.791
42	3.002	3.837	3.183	3.349	2.478	4.186	3.275	3.666
	3.670	4.664	3.645	3.950	3.021	4.081	3.866	3.513
STAGE	3.727	3.689	2.502	2.989	4.098	3.401	4.482	3.328
29	3.193	5.386	3.662	2.739	2.929	4.786	4.159	3.670
	4.274	3.573	2.905	2.736	2.488	3.658	4.526	3.949
	3.630	3.532	2.845	2.841	3.501	3.967	3.808	3.334
	2.516	3.373	3.687	3.587	2.950	3.541	3.586	3.974
	4.647	3.423	3.884	3.594	3.299	4.447	4.898	3.506
	3.607	4.237	2.752	3.942	3.643	3.351	4.548	4.343
	3.163	3.374	4.946	3.468	3.692	3.132	2.286	2.887
	4.796	3.010	3.130	4.196		3.550	3.395	2.904
	3.701		3.298			3.613	3.599	3.126
	3.409					4.362		3.412
	3.432							
	3.664							

Individual Statis	tion							
		40	4-	40	4.	4.0	4=	40
N	20	16	17	16	15	18	17	18
Mean	3.671	3.696	3.399	3.439	3.271	3.865	3.732	3.558
Var. (S ²)	0.313	0.433	0.414	0.403	0.252	0.201	0.464	0.230
SEM	0.125	0.164	0.156	0.159	0.130	0.106	0.165	0.113
EM01 Average				EM02 Average				
Total N	69			Total N	68			
Site Mean	3.551			Site Mean	3.606			
Var. (S ²)	0.024			Var. (S ²)	0.066			
SEM	0.077			SEM	0.128			
Site Average								
Total N	137							
Site Mean	3.579							
Var. (S ²)	0.002							
SEM	0.028							

<u></u>	EM01-1	EM01-2	EM01-3	EM01-4	EM02-1	EM02-2	EM02-3	EM02-4
	3.324	4.054	2.979	3.792	3.890	5.081	4.285	5.115
DATE	4.023	3.799	3.620	3.467	3.872	3.727	2.755	3.863
07/11/00	3.964	3.261	3.393	5.739	3.638	4.018	3.886	3.853
	3.116	3.359	3.691	3.473	4.373	4.079	3.585	3.487
STUDY DAY	4.295	3.266	5.058	3.413	3.259	3.523	2.760	3.819
48	4.386	3.855	4.501	3.484	3.362	3.961	4.641	3.769
	3.764	3.233	3.053	3.347	3.567	3.701	3.909	3.812
STAGE	4.509	4.204	3.179	3.228	3.028	3.675	4.713	3.447
30	3.732	3.981	3.235	3.675	2.299	4.748	3.886	3.357
	3.157	5.218	3.913	3.258	3.692	3.952	4.685	4.045
	3.054	3.701	3.519	3.239	3.306	3.902	4.025	4.276
	3.132	3.250	3.570	3.767	3.668	3.814	4.217	2.984
	4.747	3.947	3.805	3.705	4.439	3.635	5.647	3.490
	3.753	3.788	4.391	4.345	3.808	3.938	3.943	5.165
	3.525	5.674	2.833	3.949	3.658	4.363	2.264	3.862
	3.559	3.628	3.285	3.826		3.663	3.543	3.260
	4.802		3.836			4.181	4.132	3.684
	5.167					3.575		3.658
	3.314							
	3.362							

Individual Stati	etice							
N	20	16	17	16	15	18	17	18
Mean	3.834	3.889	3.639	3.732	3.591	3.974	3.934	3.830
Var. (S ²)	0.400	0.475	0.342	0.376	0.271	0.168	0.669	0.317
` '								
SEM	0.141	0.172	0.142	0.153	0.135	0.097	0.198	0.133
EM01 Average				EM02 Average				
Total N	69			Total N	68			
Site Mean	3.773			Site Mean	3.832			
Var. (S ²)	0.012			Var. (S ²)	0.030			
SEM	0.055			SEM	0.086			
Site Average								
Total N	137							
Site Mean	3.803							
Var. (S ²)	0.002							
SEM	0.029							

_	EM01-1	EM01-2	EM01-3	EM01-4	EM02-1	EM02-2	EM02-3	EM02-4
	4.749	4.107	5.539	4.061	3.815	4.173	4.502	4.932
DATE	3.323	5.180	3.440	4.210	3.682	3.831	5.523	4.986
08/08/00	3.052	4.687	3.657	4.109	4.326	4.644	4.233	5.690
	4.007	4.742	4.868	5.411	3.246	4.672	2.739	3.775
STUDY DAY	5.520	4.600	4.043	3.673	3.583	5.941	4.343	3.208
76	5.334	4.324	3.736	4.493	3.385	4.025	5.068	4.293
	4.297	4.055	4.657	4.102	4.772	4.683	5.171	3.783
STAGE	5.273	5.301	3.286	3.058	5.046	3.881	6.426	4.327
38	3.311	3.263	4.528	3.179	4.142	4.214	5.343	4.028
	5.034	5.186	4.135	3.761	4.074	4.517	4.028	4.217
	3.832	6.018	3.840	3.129	3.608	3.728	3.370	4.278
	4.638	3.823	4.940	3.687	2.859	5.727	4.102	4.072
	4.327	4.786	3.887	3.695	3.240	2.836	4.041	3.595
		4.510	3.645	5.280	3.245	4.672	4.125	4.862
		5.055	5.471	5.081	3.836	4.350	5.656	4.989
				4.541		4.298	5.277	3.773
						4.102		4.517
						4.124		

In dividend Otati	-4!							
Individual Statis								
N	13	15	15	16	15	18	16	17
Mean	4.361	4.642	4.245	4.092	na	4.357	4.622	4.313
Var. (S ²)	0.676	0.460	0.512	0.530	0.361	0.488	0.876	0.393
SEM	0.228	0.175	0.185	0.182	0.155	0.165	0.234	0.152
EM01 Average				EM02 Average				
Total N	59			Total N	66			
Site Mean	4.335			Site Mean	4.430			
Var. (S ²)	0.054			Var. (S ²)	0.028			
SEM	0.116			SEM	0.096			
Site Average								
Total N	125							
Site Mean	4.383							
Var. (S ²)	0.005							
SEM	0.048							

			-	Amphibian	rossover Stud	y - Survival on Day	10€	
Start Date:		Ţ	est ID:			Sample ID:	Crossover	
End Date:		L	ab ID:			Sample Type:	PCB sediments	
Sample Date:		F	rotocol:			Test Species:	Rana Pipiens	
Comments: L	eopard fro	g - Crossov	er Study; ι	ising only R	EM01 data			
Conc-mg/Kg	1	2	3	4				
MP (0.04)	0.4000	0.7500	0.4000	0.6500				
W8 (120)	0.6000	0.6500	0.6500	0.8000				

		_	Ti	ransform:	Arcsin Sq	uare Root			1-Tailed	
Conc-mg/Kg	Mean	SD	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
MP	0.5500	0.1780	0.8386	0.6847	1.0472	21.848	4			
W8	0.6750	0.0866	0.9672	0.8861	1.1071	9.971	4	-1.242	1.943	0.2012

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.918895		0.749		0.376561	-1.30401
F-Test indicates equal variances (p = 0.32)	3.609126		47.46835			
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.198912	0.359634	0.033067	0.021434	0.260552	1, 6

Due to possible confounding sources of variation (egg source, egg mass, laboratory setup/handling), data for R1 EM01(120 m/kg PCB) and R3 EM02 (0.04 mg/kg PCB) were not included in the crossover analysis

Page 1 ToxCalc v5.0.23 Reviewed by:____

		Amp	hibian Cro	ssover Stu	y - Average # malformation observ	ved over 76 days
Start Date:		T	est ID:		Sample ID:	Crossover
End Date:		L	ab ID:		Sample Type:	PCB sediments
Sample Date:		F	Protocol:		Test Species:	Rana Pipiens
Comments:	Leopard frog	g - Crossov	er Study; a	verage # m	formations observed over 76 days no	ot including mortality as a malformation
Conc-%	1	2	3	4		
W8	5.0000	4.8000	4.4000	4.8000		
MP	0.2000	0.4000	0.6000	0.4000		

				Transform	n: Untrans	formed			1-Tailed	
Conc-%	Mean	SD	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
W8	4.7500	0.2517	4.7500	4.4000	5.0000	5.298	4			
*MP	0.4000	0.1633	0.4000	0.2000	0.6000	40.825	4	29.000	1.943	0.2915

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.930376		0.749		-0.6789	0.198765
F-Test indicates equal variances (p = 0.50)	2.375		47.46835			
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.291477	0.061364	37.845	0.045	1.1E-07	1, 6

FEL to comment on appropriateness of analysis at 76 days.

This time period was selected for analysis because it enabled comparison of the two treatment groups at the same point in time (observation day).

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Amphibian Crossover Study - Length on Day 69/ # surviving larvae on Day 69/

Start Date: Test ID: Sample ID: Crossover

End Date: Lab ID: Sample Type: PCB sediments

Sample Date: Protocol: Test Species: Rana Pipiens

Comments: Leopard frog - Crossover Study; using only R3 EM01 data; length/surviving larvae

Conc-mg/Kg 1 2 3 4

Conc-mg/Kg	1	2	3	4	
MP	0.3355	0.3095	0.2830	0.2558	
W8	0.2732	0.2629	0.2420	0.2312	

		_		Transform	n: Untrans	formed	•		1-Tailed		
Conc-mg/Kg	Mean	SD	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	
MP	0.2959	0.0343	0.2959	0.2558	0.3355	11.588	4				
*W8	0.2523	0.0192	0.2523	0.2312	0.2732	7.594	4	2.221	1.943	0.0382	

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.979174		0.749		-0.03281	-0.56897
F-Test indicates equal variances (p = 0.36)	3.202972		47.46835			
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.038165	0.12897	0.003804	0.000771	0.068146	1, 6

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			Amp	hibian Crossovei	r Study - Metamorphosis on Da	ay 10€	
Start Date:		Ţ	est ID:		Sample ID:	Crossover	
End Date:		L	.ab ID:		Sample Type:	PCB sediments	
Sample Date:		F	Protocol:		Test Species:	Rana Pipiens	
Comments: L	_eopard fro	g - Crossov	/er Study; ι	ising only R3 EM0	1 data; # metamorph/# seeded		
Conc-mg/Kg	1	2	3	4			
MP	0.0000	0.1000	0.0500	0.0000			
W8	0.1000	0.1000	0.0500	0.1000			

		_	Ti	ransform:	Arcsin Sq	uare Root			1-Tailed	
Conc-mg/Kg	Mean	SD	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
MP	0.0375	0.0479	0.1928	0.1120	0.3218	52.497	4			
W8	0.0875	0.0250	0.2977	0.2255	0.3218	16.164	4	-1.871	1.943	0.1089

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.855798		0.749		0.380017	-0.27907
F-Test indicates equal variances (p = 0.25)	4.425954		47.46835			
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.029698	0.808633	0.02199	0.006282	0.110525	1, 6

Due to possible confounding sources of variation (egg source, egg mass, laboratory setup/handling), data for R1 EM01(120 m/kg PCB) and R3 EM02 (0.04 mg/kg PCB) were not included in the crossover analysis

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Spike Study

Raw Data:
Mortality
Malformations
Hypothesis Testing Tables

HOUSATONIC RIVER PROJECT SPIKE RANA pipiens DEVELOPMENTAL STUDY 2000 MORTALITY DATA R4 EXTERNAL REFERENCE LARVAE IN SITE 40 (MP) WATER/SEDIMENT (SPIKED WITH 30.0 mg/Kg AROCLOR 1260)

R4 Ref Larvae in Ref Site MP (Spiked with 30.0 mg/Kg Aroclor 1260), 23 Days*

*Test Durati	ion																				
			REPLIC	CATE 1			REPLI	CATE 2			REPLIC	CATE 3			REPLIC	ATE 4			REPLIC	ATE 5	
		NO.	CUMUL.	CUMUL.	%	NO.	CUMUL.	CUMUL.	%	NO.	CUMUL.	CUMUL.	%	NO.	CUMUL.	CUMUL.	%	NO.	CUMUL.	CUMUL.	%
DATE	DAY	DEAD	DEAD	LIVE	DEAD	DEAD	DEAD	LIVE	DEAD	DEAD	DEAD	LIVE	DEAD	DEAD	DEAD	LIVE	DEAD	DEAD	DEAD	LIVE	DEAD
10/30/2000	0	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00
11/1/2000	2	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00
11/2/2000	3	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00
11/3/2000	4	1	1	9	10.00	1	1	9	10.00	1	1	9	10.00	2	2	8	20.00	0	0	10	0.00
11/6/2000	7	0	1	9	10.00	0	1	9	10.00	0	1	9	10.00	0	2	8	20.00	1	1	9	10.00
11/7/2000	8	0	1	9	10.00	0	1	9	10.00	0	1	9	10.00	0	2	8	20.00	0	1	9	10.00
11/13/2000	14	0	1	9	10.00	0	1	9	10.00	0	1	9	10.00	0	2	8	20.00	0	1	9	10.00
11/14/2000	15	0	1	9	10.00	0	1	9	10.00	0	1	9	10.00	0	2	8	20.00	0	1	9	10.00
11/15/2000	16	0	1	9	10.00	0	1	9	10.00	0	1	9	10.00	1	3	7	30.00	0	1	9	10.00
11/16/2000	17	0	1	9	10.00	0	1	9	10.00	0	1	9	10.00	0	3	7	30.00	0	1	9	10.00
11/17/2000	18	0	1	9	10.00	1	2	8	20.00	0	1	9	10.00	1	4	6	40.00	0	1	9	10.00
11/20/2000	21	0	1	9	10.00	2	4	6	40.00	0	1	9	10.00	6	10	0	100.00	0	1	9	10.00
11/21/2000	22	0	1	9	10.00	1	5	5	50.00	0	1	9	10.00	0	10	0	100.00	0	1	9	10.00
11/22/2000	23	0	1	9	10.00	0	5	5	50.00	0	1	9	10.00	0	10	0	100.00	0	1	9	10.00

			REPLIC	CATE 6			REPLI	CATE 7			REPLI	CATE 8			CUMULA	TIVE	
		NO.	CUMUL.	CUMUL.	%	NO.	CUMUL.	CUMUL.	%	NO.	CUMUL.	CUMUL.	%	MO	RTALITY S	TATISTI	CS
DATE	DAY	DEAD	DEAD	LIVE	DEAD	DEAD	DEAD	LIVE	DEAD	DEAD	DEAD	LIVE	DEAD	MEAN %	VAR (S2)	SEM	CV (%)
10/30/2000	0	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0.00	0.00	0.00	na
11/1/2000	2	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0.00	0.00	0.00	na
11/2/2000	3	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0.00	0.00	0.00	na
11/3/2000	4	1	1	9	10.00	1	1	9	10.00	0	0	10	0.00	8.75	41.07	2.27	73.24
11/6/2000	7	0	1	9	10.00	0	1	9	10.00	0	0	10	0.00	10.00	28.57	1.89	53.45
11/7/2000	8	0	1	9	10.00	0	1	9	10.00	0	0	10	0.00	10.00	28.57	1.89	53.45
11/13/2000	14	0	1	9	10.00	0	1	9	10.00	0	0	10	0.00	10.00	28.57	1.89	53.45
11/14/2000	15	0	1	9	10.00	0	1	9	10.00	0	0	10	0.00	10.00	28.57	1.89	53.45
11/15/2000	16	0	1	9	10.00	0	1	9	10.00	0	0	10	0.00	11.25	69.64	2.95	74.18
11/16/2000	17	0	1	9	10.00	0	1	9	10.00	0	0	10	0.00	11.25	69.64	2.95	74.18
11/17/2000	18	0	1	9	10.00	0	1	9	10.00	1	1	9	10.00	15.00	114.29	3.78	71.27
11/20/2000	21	0	1	9	10.00	0	1	9	10.00	2	3	7	30.00	27.50	992.86	11.14	114.58
11/21/2000	22	0	1	9	10.00	0	1	9	10.00	0	3	7	30.00	28.75	1041.07	11.41	112.23
11/22/2000	23	0	1	9	10.00	0	1	9	10.00	0	3	7	30.00	28.75	1041.07	11.41	112.23

HOUSATONIC RIVER PROJECT SPIKE RANA pipiens DEVELOPMENTAL STUDY 2000 MORTALITY DATA R4 EXTERNAL REFERENCE LARVAE IN SITE 40 (MP) WATER/SEDIMENT (UNSPIKED)

R4 Ref Larvae in Ref Site MP Unspiked (0.04 mg/Kg Sed PCB), 23 Days*

* Lest Durati	ion																				
			REPLIC	CATE 1			REPLI	CATE 2			REPLIC	CATE 3			REPLICA	ATE 4			REPLIC	ATE 5	
		NO.	CUMUL.	CUMUL.	%	NO.	CUMUL.	CUMUL.	%	NO.	CUMUL.	CUMUL.	%	NO.	CUMUL.	CUMUL.	%	NO.	CUMUL.	CUMUL.	%
DATE	DAY	DEAD	DEAD	LIVE	DEAD	DEAD	DEAD	LIVE	DEAD	DEAD	DEAD	LIVE	DEAD	DEAD	DEAD	LIVE	DEAD	DEAD	DEAD	LIVE	DEAD
10/30/2000	0	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00
11/1/2000	2	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00
11/2/2000	3	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00
11/3/2000	4	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00
11/6/2000	7	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00
11/7/2000	8	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00
11/13/2000	14	1	1	9	10.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00
11/14/2000	15	0	1	9	10.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00
11/15/2000	16	0	1	9	10.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00
11/16/2000	17	0	1	9	10.00	0	0	10	0.00	4	4	6	40.00	9	9	1	90.00	0	0	10	0.00
11/17/2000	18	0	1	9	10.00	0	0	10	0.00	0	4	6	40.00	1	10	0	100.00	0	0	10	0.00
11/20/2000	21	0	1	9	10.00	0	0	10	0.00	5	9	1	90.00	0	10	0	100.00	0	0	10	0.00
11/21/2000	22	0	1	9	10.00	0	0	10	0.00	0	9	1	90.00	0	10	0	100.00	0	0	10	0.00
11/22/2000	23	0	1	9	10.00	0	0	10	0.00	0	9	1	90.00	0	10	0	100.00	0	0	10	0.00

			REPLIC	CATE 6			REPLI	CATE 7			REPLIC	CATE 8			CUMULA	TIVE	
		NO.	CUMUL.	CUMUL.	%	NO.	CUMUL.	CUMUL.	%	NO.	CUMUL.	CUMUL.	%	MO	RTALITY S	FATISTIC	cs
DATE	DAY	DEAD	DEAD	LIVE	DEAD	DEAD	DEAD	LIVE	DEAD	DEAD	DEAD	LIVE	DEAD	MEAN %	VAR (S2)	SEM	CV (%)
10/30/2000	0	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0.00	0.00	0.00	na
11/1/2000	2	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0.00	0.00	0.00	na
11/2/2000	3	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0.00	0.00	0.00	na
11/3/2000	4	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0.00	0.00	0.00	na
11/6/2000	7	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0.00	0.00	0.00	na
11/7/2000	8	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	0.00	0.00	0.00	na
11/13/2000	14	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	1.25	12.50	1.25	282.84
11/14/2000	15	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	1.25	12.50	1.25	282.84
11/15/2000	16	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	1.25	12.50	1.25	282.84
11/16/2000	17	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	17.50	1050.00	11.46	185.16
11/17/2000	18	0	0	10	0.00	0	0	10	0.00	0	0	10	0.00	18.75	1269.64	12.60	190.04
11/20/2000	21	0	0	10	0.00	1	1	9	10.00	0	0	10	0.00	26.25	1826.79	15.11	162.82
11/21/2000	22	0	0	10	0.00	0	1	9	10.00	0	0	10	0.00	26.25	1826.79	15.11	162.82
11/22/2000	23	0	0	10	0.00	0	1	9	10.00	0	0	10	0.00	26.25	1826.79	15.11	162.82

HOUSATONIC RIVER PROJECT SPIKE RANA pipiens DEVELOPMENTAL STUDY 2000 MALFORMATION DATA

10/30/2000-11/22/2000

R4 Ref Larvae in Ref Site MP Spiked with 30.0 mg/Kg Aroclor 1260

REPLICATE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%		TYPE C	OF MALFO	RMATION (D	ELTS OBSEVERED)	
ID	at DAY 0	LIVING	MALFORMED	MAL.	TAIL	FACE	EYE	BRAIN	HEMORRHAGE	BLISTER
1	10	9	2	20.00	2	2	2	1		1
2	10	5	2	20.00	1	2		2		1
3	10	9	2	20.00		2		2		2
4	10	0	na	na						
5	10	9	3	30.00	2	1		3	1	1
6	10	9	3	30.00	3	3		2	1	1
7	10	9	4	40.00	2	2		4	2	3
8	10	7	1	10.00	1	1			1	1
Total:	80	57	17		11	13	2	14	5	10
	Mea	ns (based on in	itial larval count):	24.29	15.71	18.57	2.86	20.00	7.14	14.29
			SEM:	3.45	0.27	0.24	na	0.37	0.18	0.28

10/30/2000-11/22/2000

R4 Ref Larvae in Ref Site MP Unspiked (0.04 mg/Kg Sed PCB)

REPLICATE	INITIAL No. LARVAE	No. of LARVAE	NUMBER	%		TYPE (OF MALFO	RMATION (D	ELTS OBSEVERED)	
ID	at DAY 0	LIVING	MALFORMED	MAL.	TAIL	FACE	EYE	BRAIN	HEMORRHAGE	BLISTER
	40		•							
1	10	9	0	0.00						
2	10	10	0	0.00						
3	10	1	0	0.00						
4	10	0	na	na						
5	10	10	0	0.00						
6	10	10	0	0.00						
7	10	9	0	0.00						
8	10	10	0	0.00						
Total:	80	59	0		0	0	0	0	0	0
	Me	ans (based on ir	itial larval count):	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			SEM:	0.00	na	na	na	na	na	na

				Amphibi	an Spiked	Study - S	urvival on	Day 23	
Start Date:		7	est ID:				Sample ID:		Crossover
End Date:		L	ab ID:				Sample Typ	e:	PCB sediments
Sample Date:		F	Protocol:				Test Specie	s:	Rana Pipiens
Comments: L	eopard fro	g - Spiked	Study						
Conc-mg/Kg	1	2	3	4	5	6	7	8	
unspiked	0.9000	1.0000	0.1000	0.0000	1.0000	1.0000	0.9000	1.0000	
spiked	0.9000	0.5000	0.9000	0.0000	0.9000	0.9000	0.9000	0.7000	

		_	Tı	ransform:	Arcsin Sq	uare Root		Rank	1-Tailed
Conc-mg/Kg	Mean	SD	Mean	Min	Max	CV%	N	Sum	Critical
unspiked	0.7375	0.4274	1.0783	0.1588	1.4120	48.589	8		
spiked	0.7125	0.3227	1.0226	0.1588	1.2490	38.052	8	55.50	51.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.714335	0.844	-1.42026	0.49517
F-Test indicates equal variances (p = 0.45)	1.813182	8.885308		
Hypothesis Test (1-tail, 0.05)				

Wilcoxon Two-Sample Test indicates no significant differences

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				Amphibia	an Spiked	Studv - #	Normal on	Dav 23	
Start Date:	Test ID:								Crossover
End Date:	Lab ID:				Sample Type: F			PCB sediments	
Sample Date:	Protocol:					Test Species:			Rana Pipiens
Comments: L	eopard frog	g - Spiked	Study; malf	ormations	do not inclu	ide dead			
Conc-mg/Kg	1	2	3	4	5	6	7	8	
unspiked	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		
spiked	1.0000	0.8000	0.8000	0.8000	0.7000	0.7000	0.6000	0.9000	

		_	Transform: Arcsin Square Root			Rank	1-Tailed		
Conc-mg/Kg	Mean	SD	Mean	Min	Max	CV%	N	Sum	Critical
unspiked	1.0000	0.0000	1.4120	1.4120	1.4120	0.000	7		
*spiked	0.7875	0.1246	1.1064	0.8861	1.4120	14.846	8	39.50	49.00

Auxiliary Tests	Statistic	Critical	Skew Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.78613	0.835	0.931763 3.386628
Equality of variance cannot be confirmed			
Hypothesis Test (1-tail, 0.05)			
Wilcoxon Two-Sample Test indicates significant differences			

Since there are no malformations observed in the unspiked group, unless there are no malformation in the spiked group, a statistical difference will be found; assess if the difference in median responses are biologically significant

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Appendix F

Photo Atlas

HOUSATONIC RIVER PROJECT RANA pipiens STUDY 2000 PHOTO ATLAS TABLE OF FIGURES

- Figure 1. Male Rana pipiens adult from Site 34 (W-7a).
- **Figure 2.** Female *R. pipiens* adult from Site 34 (W-7a).
- **Figure 3.** Young female *R. pipiens* from Site 39 (W-1). Reproductively mature and "slightly gravid".
- **Figure 4.** Necropsy of healthy female from Site 36 (W-4). Note normalcy of stomach, liver, and intestine. Ovaries were removed and appear in Figure 5.
- **Figure 5.** Mature ovary with normal distribution of maturing oocytes from Site 36 (W-4).
- Figure 6. Immature ovary from Site 34 (W-7a).
- **Figure 7.** Mature testes from male specimen collected from Site 39 (W-1).
- Figure 8. Abnormal testes from male specimen collected from Site 34 (W-7a).
- **Figure 9.** Reference larvae (R3) demonstrating normal development in Site 40 (MP) water.
- **Figure 10.** Reference larvae (R3) in Site 33 (W-8) water demonstrating kinked tails.
- **Figure 11.** Normal metamorphs cultured from artificially fertilized egg masses (Reference R3) in Reference Site 40 (MP) water.
- **Figure 12.** Healthy gut from *R. pipiens* specimen from Site 33 (W-8).
- **Figure 13.** Distended, unhealthy gut from Site 33 (W-8) specimen.
- **Figure 14.** Stomach tumors found in *R. pipiens* specimen from Site 35 (W-6).
- **Figure 15.** Healthy liver from *R. pipiens* specimen collected from Site 39 (W-1).
- **Figure 16.** Mottled abnormal liver from specimen collected at Site 32 (W-9a).

Figure 1. Site 34 (W-7a)



Figure 2. Site 34 (W-7a)



Figure 3. Site 39 (W-1)



Figure 4. Site 36 (W-4)

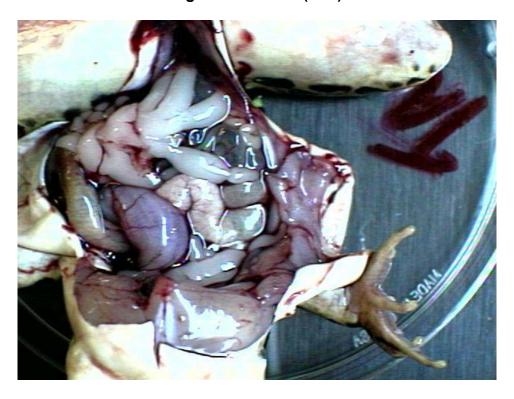
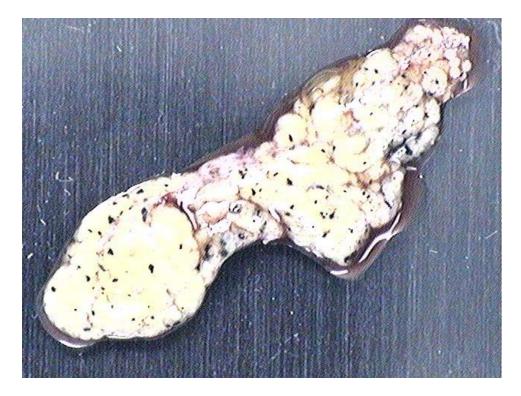


Figure 5. Site 36 (W-4)



Figure 6. Site 34 (W-7a)



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Figure 7. Site 39 (W-1)

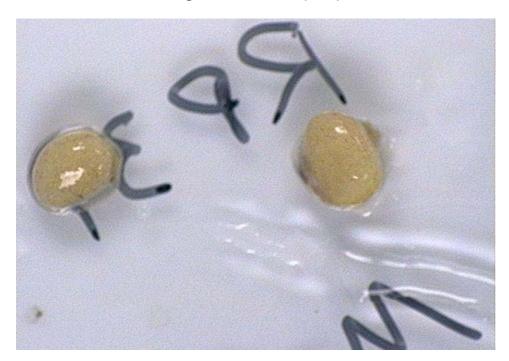


Figure 8. Site 34 (W-7a)







Figure 10. Reference Larvae R3 in Site 33 (W-8)

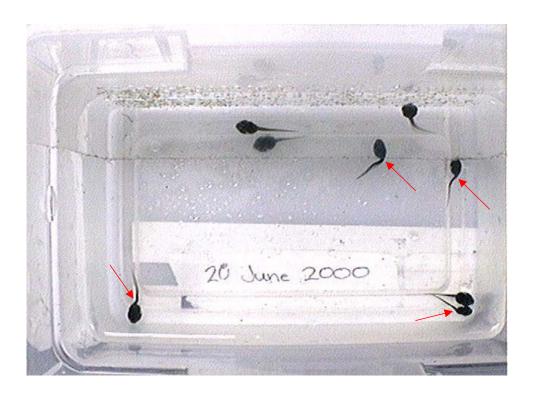






Figure 12. Site 33 (W-8)

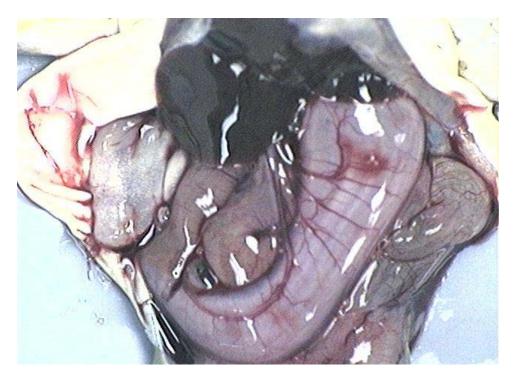


Figure 13. Site 33 (W-8)

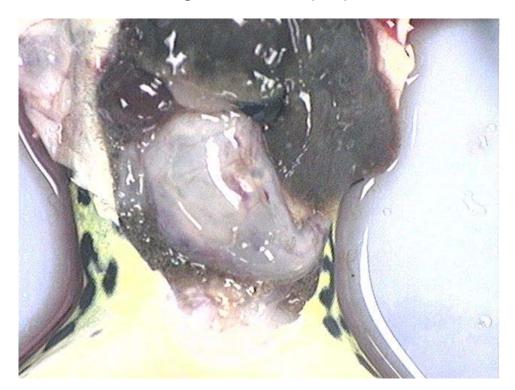
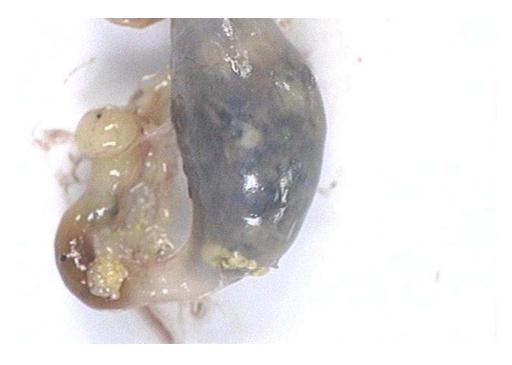


Figure 14. Site 35 (W-6)



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Figure 15. Site 39 (W-1)

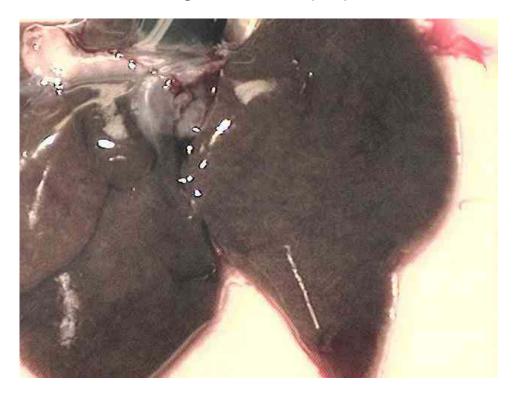
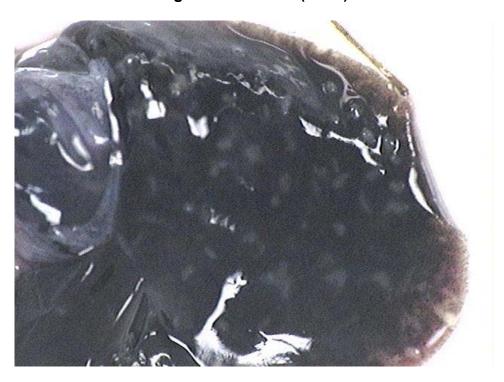


Figure 16. Site 32 (W-9a)



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